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Prepared by, and after recording return to:

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326.00

Total :

2006-073513

04/24/2006 10:38:49am

Loan No. 89577

LINE OF CREDIT TRUST DEED, SECURITY AGREEMENT AND FIXTURE FILING

ADVANCED AMERICAN CONSTRUCTION PROPERTIES, LLC,

an Oregon limited liability company, Borrower,

> having an office at 8444 NW St. Helens Road Portland, Oregon 97231

> > to

FIDELITY NATIONAL TITLE INSURANCE COMPANY,

Trustee

for the benefit of

TRANSAMERICA LIFE INSURANCE COMPANY,

an Iowa corporation,

Lender,

having an office

c/o AEGON USA Realty Advisors, Inc.

4333 Edgewood Road, N.E.

Cedar Rapids, Iowa 52499-5443

Maximum Amount Secured: \$9,000,000

Loan Amount: \$4,500,000

Property Acct. No. R961110180 Map and Tax Lot No. 1N1W11AC-00300

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AAC Headquarter Building, Portland, Oregon AEGON Loan No. 89577 Seattle-3289047.2 0027988-00443



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Line of Credit Trust Deed, Security Agreement and Fixture Filing

(Multnomah County, Oregon)

This Line of Credit Trust Deed, Security Agreement and Fixture Filing (this "Trust Deed") is made and given as of the day of April, 2006, by ADVANCED AMERICAN CONSTRUCTION PROPERTIES, LLC, an Oregon limited liability company, as grantor, whose address is 8444 NW St. Helens Road, Portland, Oregon 97231 (the "Borrower"), to FIDELITY NATIONAL TITLE INSURANCE COMPANY, as Trustee, whose address is 900 SW Fifth Avenue, Portland, Oregon 97204 (the "Trustee"), for the benefit of TRANSAMERICA LIFE INSURANCE COMPANY, an Iowa corporation, as beneficiary, whose address is c/o AEGON USA Realty Advisors, Inc., 4333 Edgewood Road, N.E., Cedar Rapids, Iowa 52499-5443 (the "Lender"). The definitions of capitalized terms used in this Trust Deed may be found either in Section 3 below, or through the cross-references provided in that Section.

The final due date of the sums secured hereby is May 1, 2024. The maximum principal amount to be advanced is Four Million Five Hundred Thousand Dollars (\$4,500,000), provided, however that the maximum principal amount to be advanced may be exceeded by advances to complete construction pursuant to ORS 86.155 (2) (c), for reasonable protection of the Real Property, including but not limited to advances to pay real property taxes, hazard insurance premiums, maintenance charges imposed under a declaration of restrictive covenants, reasonable attorneys' fees, and other advances described in Subsection 25.22 or elsewhere in this Trust Deed.

1. RECITALS

- A. Under the terms of a commercial Loan Application/Commitment dated June 22, 2005 (the "Commitment"), AEGON USA Realty Advisors, Inc. ("AEGON"), as agent for the Lender, agreed to fund a loan in the principal amount of Four Million Five Hundred Thousand Dollars (\$4,500,000) (the "Loan").
- B. The Lender has funded the Loan in the principal amount of Four Million Five Hundred Thousand Dollars (\$4,500,000) in accordance with the Commitment, and to evidence the Loan, the Borrower has executed and delivered to the Lender a certain Secured Promissory Note, of even date, in the amount of \$4,500,000.
- C. The Commitment requires that the Loan be secured by all of the Borrower's existing and after-acquired interest in certain real property and by certain tangible and intangible personal property.

2. GRANTING CLAUSE

To secure the repayment of the Indebtedness, any increases, modifications, renewals or extensions of the Indebtedness, and any substitutions for the Indebtedness, as well as the

performance of the Borrower's other Obligations, and in consideration of the sum of ten dollars (\$10.00) and other valuable consideration, the receipt and sufficiency of which are acknowledged, the Borrower grants, bargains, warrants, conveys, alienates, releases, assigns, sets over and confirms to the Trustee, IN TRUST WITH THE POWER OF SALE FOR THE BENEFIT OF THE LENDER and to its successors and assigns forever, all of the Borrower's existing and after acquired interests in the Real Property, TO HAVE AND TO HOLD the Real Property and all parts, rights, members and appurtenances thereof, to the use, benefit and behalf of the Lender and its successors and assigns, IN FEE SIMPLE forever. All amounts secured hereby and payable under this Trust Deed are due and owing on the first day of the two hundred seventeenth (217th) calendar month following the date of this Trust Deed.

3. DEFINED TERMS

The following defined terms are used in this Trust Deed. For ease of reference, terms relating primarily to the security agreement are defined in <u>Subsection 21.1</u>.

"AACI Lease" means the lease to the Tenant dated April 14, 2006.

"Absolute Assignment of Leases and Rents" means the Loan Document bearing this heading.

"Affiliate" of any person means any entity controlled by, or under common control with, that person.

"Appurtenances" means all rights, estates, titles, interests, privileges, easements, tenements, hereditaments, titles, royalties, reversions, remainders and other interests, whether presently held by the Borrower or acquired in the future, that may be conveyed as interests in the Land under the laws of Oregon. Appurtenances include the Easements and the Assigned Rights.

"Assigned Rights" means all of the Borrower's rights, easements, privileges, tenements, hereditaments, contracts, claims, licenses or other interests, whether presently existing or arising in the future. The Assigned Rights include all of the Borrower's rights in and to:

- (i) any greater estate in the Real Property;
- (ii) insurance policies required to be carried hereunder, including the right to negotiate claims and to receive Insurance Proceeds and unearned insurance premiums (except as expressly provided in <u>Subsection 8.2</u>);
- (iii) Condemnation Proceeds;
- (iv) licenses and agreements permitting the use of sources of groundwater or water utilities, septic leach fields, railroad sidings, sewer lines, means of ingress and egress;
- (v) drainage over other property;
- (vi) air space above the Land;
- (vii) mineral rights;

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- (viii) party walls;
- (ix) vaults and their usage;
- (x) franchises;
- (xi) commercial tort claims that arise during the Loan term in respect of damages to the Real Property or to its operations, in respect of any impairment to the value of the Real Property, or in respect of the collection of any Rents;
- (xii) construction contracts;
- (xiii) roof and equipment guarantees and warranties;
- (xiv) building and development licenses and permits;
- (xv) tax credits or other governmental entitlements, credits or rights, whether or not vested;
- (xvi) licenses and applications (whether or not yet approved or issued);
- (xvii) rights under management and service contracts;
- (xviii) leases of Fixtures; and
- (xix) trade names, trademarks, trade styles, service marks, copyrights, and agreements with architects, environmental consultants, property tax consultants, engineers, and any other third party contractors whose services benefit the Real Property.

"Bankruptcy Code" means the Bankruptcy Reform Act of 1978, as amended, 11 U.S.C. Sections 101 et seq., and the regulations promulgated pursuant to those statutes.

"Business Day" means any day when state and federal banks are open for business in Cedar Rapids, Iowa.

"Condemnation Proceeds" means all money or other property that has been, or is in the future, awarded or agreed to be paid or given in connection with any taking by eminent domain of all or any part of the Real Property (including a taking through the vacation of any street dedication or through a change of grade of such a street), either permanent or temporary, or in connection with any purchase in lieu of such a taking, or as a part of any related settlement, except for the right to condemnation proceeds awarded to the Tenant in a separate proceeding in respect of the lost value of the Tenant's leasehold interest, provided that the award does not reduce, directly or indirectly, the award to the owner of the Real Property.

"Curable Nonmonetary Default" means any of the acts, omissions, or circumstances specified in Subsection 10.3 below.

"Default" means any of the acts, omissions, or circumstances specified in Section 10 below.

"Default Rate" means the rate of interest specified as the "Default Rate" in the Note.

"<u>Development Agreements</u>" means all development, utility or similar agreements included in the Permitted Encumbrances.

"Easements" means the Borrower's existing and future interests in and to the declarations, easements, covenants, and restrictions appurtenant to the Land.

"Environmental Indemnity Agreement" means the Loan Document bearing that heading.

"Environmental Laws" means all present and future laws, statutes, ordinances, rules, regulations, orders, guidelines, rulings, decrees, notices and determinations of any Governmental Authority to the extent that they pertain to: (A) the protection of health against environmental hazards; (B) the protection of the environment, including air, soils, wetlands, and surface and underground water, from contamination by any substance that may have any adverse health effect on humans, livestock, fish, wildlife, or plant life, or which may disturb an ecosystem; (C) underground storage tank regulation or removal; (D) wildlife conservation; (E) protection or regulation of natural resources; (F) the protection of wetlands; (G) management, regulation and disposal of solid and hazardous wastes; (H) radioactive materials; (I) biologically hazardous materials; (J) indoor air quality; or (K) the manufacture, possession, presence, use, generation, storage, transportation, treatment, release, emission, discharge, disposal, abatement, cleanup, removal, remediation or handling of any Hazardous Substances. "Environmental Laws" include the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. §9601 et seq., the Resource Conservation and Recovery Act, 42 U.S.C. §6901 et seq., the Federal Water Pollution Control Act, as amended by the Clean Water Act, 33 U.S.C. §1251 et seq., the Clean Air Act, 42 U.S.C. §7401 et seq., the Toxic Substances Control Act, 15 U.S.C. §2601 et seq., all similar state statutes and local ordinances, and all regulations promulgated under any of those statutes, and all administrative and judicial actions respecting such legislation, all as amended from time to time.

"ESA" means the written environmental site assessment of the Real Property obtained under the terms of the Commitment.

"Escrow Expenses" means those expenses in respect of real and personal property taxes and assessments, Insurance Premiums and such other Impositions as the Lender pays from time to time directly from the Escrow Fund using monies accumulated through the collection of Monthly Escrow Payments.

"Escrow Fund" means the funds deposited by Borrower with the Lender pursuant to Section 9 hereof, as reflected in the accounting entry maintained on the books of the Lender as funds available for the payment of Escrow Expenses under the terms of this Trust Deed.

"Fixtures" means all materials, supplies, equipment, apparatus and other items now or hereafter attached to or installed on the Land and Improvements in a manner that causes them to become fixtures under the laws of Oregon, including all built-in or attached furniture or appliances, elevators, escalators, heating, ventilating and air conditioning system components, emergency electrical generators and related fuel storage or delivery systems, septic system components, storm windows, doors, electrical equipment, plumbing, water conditioning, lighting, cleaning, snow removal, lawn, landscaping, irrigation, security, incinerating, fire-fighting, sprinkler or other fire safety equipment, bridge cranes or other installed materials handling equipment,

satellite dishes or other telecommunication equipment, built-in video conferencing equipment, sound systems or other audiovisual equipment, and cable television distribution systems. Fixtures do not include trade fixtures, office furniture and office equipment owned by tenants who are unrelated to the Borrower. Fixtures expressly include HVAC, mechanical, security and similar systems of general utility for the operation of the Improvements as leasable commercial real property.

"Governmental Authority" means any political entity with the legal authority to impose any requirement on the Property, including the governments of the United States, the State of Oregon, Multnomah County, the City of Portland, and any other entity with jurisdiction to decide, regulate, or affect the ownership, construction, use, occupancy, possession, operation, maintenance, alteration, repair, demolition or reconstruction of any portion or element of the Real Property.

"Guarantor" means Michael S. Johns, Marvin D. Burch, Jeff Harper, James Daubersmith, Grayson Hart and Timothy Nelson, jointly and severally.

"Hazardous Substance" means any substance the release of or the exposure to which is prohibited, limited or regulated by any Environmental Law, or which poses a hazard to human health because of its toxicity, including, without limitation: (A) any "oil," as defined by the Federal Water Pollution Control Act and regulations promulgated thereunder (including crude oil or any fraction of crude oil), (B) any radioactive substance, and (C) Stachybotrys chartarum or other molds. However, the term "Hazardous Substance" includes neither (A) a substance used in the cleaning and maintenance of the Real Property, if the quantity, storage and manner of its use are customary, prudent, and do not violate applicable law, nor (B) automotive motor oil in immaterial quantities, if leaked from vehicles in the ordinary course of the operation of the Real Property and cleaned up in accordance with reasonable property management procedures and in a manner that violates no applicable law.

"Impositions" means all real and personal property taxes levied against the Property; general or special assessments; ground rent; water, gas, sewer, vault, electric or other utility charges; common area charges; owners' association dues or fees; fees for any easement, license or agreement maintained for the benefit of the Property; and any and all other taxes, levies, user fees, claims, charges and assessments whatsoever that at any time may be assessed, levied or imposed on the Property or upon its ownership, use, occupancy or enjoyment, and any related costs, interest or penalties. In addition, "Impositions" include all documentary, stamp or intangible personal property taxes that may become due in connection with the Indebtedness, including Indebtedness in respect of any future advance made by the Lender to the Borrower, or that are imposed on any of the Loan Documents.

"Improvements" means, to the extent of the Borrower's existing and future interest, all buildings and improvements of any kind erected or placed on the Land now or in the future, including the Fixtures, together with all appurtenant rights, privileges, Easements, tenements, hereditaments, titles, reversions, remainders and other interests.

"Indebtedness" means all sums that are owed or become due pursuant to the terms of the Note, this Trust Deed, or any of the other Loan Documents or any other writing executed by the Borrower relating to the Loan, including scheduled principal payments, scheduled interest payments, default interest, late charges, prepayment premiums, accelerated or matured principal balances, advances, collection costs (including reasonable attorneys' fees), reasonable attorneys' fees and costs in enforcing or protecting the Note, the Trust Deed, or any of the other Loan Documents in any probate, bankruptcy or other proceeding, receivership costs and all other financial obligations of the Borrower incurred in connection with the Loan transaction, provided, however, that this Trust Deed shall not secure any Loan Document or any particular person's liabilities or obligations under any Loan Document to the extent that such Loan Document expressly states that it or such particular person's liabilities or obligations are unsecured by this Trust Deed. Indebtedness shall also include any obligations under agreements executed and delivered by Borrower which specifically provide that such obligations are secured by this Trust Deed.

"Insurance Premiums" means all premiums or other charges required to maintain in force any and all insurance policies that this Trust Deed requires that the Borrower maintain.

"Insurance Proceeds" means (A) all proceeds of all insurance now or hereafter carried by or payable to the Borrower with respect to the Real Property, including with respect to the interruption of rents or income derived from the Property, all unearned insurance premiums and all related claims or demands, and (B) all Proceeds (as defined in Subsection 21.1).

"Land" means that certain tract of land located in the City of Portland, Multnomah County, Oregon, which is described on the attached Exhibit A, together with the Appurtenances.

"Leases" means the AACI Lease and all other leases, subleases, licenses, concessions, extensions, renewals and other agreements (whether written or oral, and whether presently effective or made in the future) through which the Borrower grants any possessory interest in and to, or any right to occupy or use, all or any part of the Real Property, and any related guaranties.

"Legal Control" means the power, either directly or indirectly, to exercise the authority of the owner of the Real Property, either as the majority shareholder of the common stock of a corporation, as the sole general partner of a limited partnership, as the managing general partner of a general partnership, or as the sole managers of a limited liability company, provided the person or entity exercising such authority cannot be divested of such authority without its consent, either directly or indirectly, except for cause.

"Legal Requirements" means all laws, statutes, rules, regulations, ordinances, judicial decisions, administrative decisions, building permits, development permits, certificates of occupancy, or other requirements of any Governmental Authority.

"Loan Documents" means all documents evidencing the Loan or delivered in connection with the Loan, whether entered into at the closing of the Loan or in the future.

"Maximum Permitted Rate" means the highest rate of interest permitted to be paid or collected by applicable law with respect to the Loan.

"Monthly Escrow Payment" means the sum of the Monthly Imposition Requirement, the Monthly Insurance Premium Requirement, and the Monthly Reserve Requirement.

"Monthly Imposition Requirement" means one-twelfth (1/12th) of the annual amount that the Lender estimates will be required to permit the timely payment by the Lender of those Impositions that the Lender elects, from time to time, to include in the calculation of the Monthly Imposition Requirement. Such Impositions shall include real and personal property taxes and may include, at the Lender's sole and absolute discretion any Impositions that the Borrower has failed to pay on a timely basis during the term of the Loan. The Lender shall base its estimate on the most recent information supplied by the Borrower concerning future Impositions. If the Borrower fails to supply such information or if it is unavailable at the time of estimation, the Lender shall estimate future Impositions using historical information and an annual inflation factor equal to the lesser of three percent (3%) and the maximum inflation factor permitted by law.

"Monthly Insurance Premium Requirement" means one-twelfth (1/12th) of the annual amount that the Lender estimates (based on available historical data and using, if future Insurance Premiums are as yet undeterminable, a five percent (5%) inflation factor) will be required to permit the timely payment of the Insurance Premiums by the Lender.

"Monthly Reserve Requirement" means the monthly payment amount which the Lender estimates will, over the subsequent twelve (12) months, result in the accumulation of a surplus in the Escrow Fund equal to the sum of the Monthly Imposition Requirement and the Monthly Insurance Premium Requirement.

"Net Worth Requirement" means the aggregate net worth of the Guarantors most recently represented to the Lender at the time of the approval of the Loan by AEGON's Investments Committee.

"Note" means the Secured Promissory Note dated of even date herewith to evidence the Indebtedness in the original principal amount of Four Million Five Hundred Thousand Dollars (\$4,500,000), together with all extensions, renewals and modifications.

"Notice" means a notice given in accordance with the provisions of Subsection 25.13.

"Obligations" means all of the obligations required to be performed under the terms and conditions of any of the Loan Documents by any Obligor, except for obligations that are expressly stated to be unsecured under the terms of another Loan Document.

"Obligor" means the Borrower, any Guarantor, or any other Person that is liable under the Loan Documents for the payment of any portion of the Indebtedness, or the performance of any other obligation required to be performed under the terms and conditions of any of the Loan Documents, under any circumstances.

- "Participations" means participation interests in the Loan Documents granted by the Lender.
- "Payment Guarantee" means that certain "Payment Guarantee" entered into by the Guarantor on the date of this Trust Deed evidencing the full recourse guarantee of the Indebtedness by the Guarantor.
- "Permitted Control Group Member" means each of the following individuals: Michael S. Johns, Marvin D. Burch, Jeff Harper, James Daubersmith, Grayson Hart and Timothy Nelson.
- "<u>Permitted Encumbrances</u>" means (A) the lien of taxes and assessments not yet due and payable, and (B) those matters of public record listed as special exceptions in the Lender's title insurance policy insuring the priority of this Trust Deed.
- "Permitted Transfer" means a transfer specifically described in Section 14 as permitted.
- "Person" means any individual, corporation, limited liability company, partnership, trust, unincorporated association, government, governmental authority or other entity.
- "Prohibited Structural Change" means a change in the identity of any of the entities through which the Permitted Control Group Members exercise Legal Control over the Real Property, or a change in the capacity through which any Permitted Control Group Member exercises such Legal Control.
- "Property" means the Real Property and the Leases, Rents and Personal Property (as defined in Subsection 21.1 below).
- "Rating Agencies" means one or more credit rating agencies approved by Lender.
- "Real Property" means the Land and the Improvements.
- "Rents" means all rents, income, receipts, issues and profits and other benefits paid or payable for using, leasing, licensing, possessing, operating from or in, residing in, selling, mining, extracting minerals from, or otherwise enjoying the Real Property, whether presently existing or arising in the future, to which the Borrower may now or hereafter become entitled or may demand or claim from the commencement of the Loan term through the time of the satisfaction of all of the Obligations, including security deposits, amounts drawn under letters of credit securing tenant obligations, minimum rents, additional rents, common area maintenance charges, parking revenues, deficiency rents, termination payments, space contraction payments, damages following default under a Lease, premiums payable by tenants upon their exercise of cancellation privileges, proceeds from lease guarantees, proceeds payable under any policy of insurance covering loss of rents resulting from untenantability caused by destruction or damage to the Real Property, all rights and claims of any kind which the Borrower has or may in the future have against the tenants under the Leases, lease guarantors, or any subtenants or other occupants of the Real Property, all proceeds of any sale of the Real Property in violation of the Loan Documents, any future award granted the Borrower in any court proceeding involving any such tenant in any

bankruptcy, insolvency, or reorganization proceedings in any state or federal court, and any and all payments made by any such tenant in lieu of rent.

"Restoration" means (A) in the case of a casualty resulting in damage to or the destruction of the Improvements, the repair or rebuilding of the Improvements to their original condition, or (B) in the case of the condemnation of a portion of the Real Property, the completion of such work as may be necessary in order to remedy the effects of the condemnation so that the value and income-generating characteristics of the Real Property are restored.

"Securities" means mortgage pass-through certificates or other securities evidencing a beneficial interest in the Loan, issued in a rated or unrated public offering or private placement.

"Securitization" means the issuance of Securities.

"Tenant" means Advanced American Construction, Inc., an Oregon corporation.

4. TITLE

The Borrower represents to and covenants with the Lender and with its successors and assigns that, at the point in time of the grant of the lien created by this Trust Deed, the Borrower is well seized of good and indefeasible title to the Real Property, in fee simple absolute, subject to no lien or encumbrance except the Permitted Encumbrances. The Borrower warrants this estate and title to the Lender and to its successors and assigns forever, against all lawful claims and demands of all persons. The Borrower shall maintain mortgagee title insurance issued by a solvent carrier, covering the Real Property in an amount at least equal to the amount of the Loan's original principal balance. This Trust Deed is and shall remain a valid and enforceable first lien on the Real Property, and if the validity or enforceability of this first lien is attacked by appropriate proceedings, the Borrower shall diligently and continuously defend it through appropriate proceedings. Should the Borrower fail to do so, the Lender may at the Borrower's expense take all necessary action, including the engagement and compensation of legal counsel, the prosecution or defense of litigation, and the compromise or discharge of claims. The Borrower shall defend, indemnify and hold the Lender harmless in any suit or proceeding brought to challenge or attack the validity, enforceability or priority of the lien granted by this Trust Deed. If a prior construction, mechanics' or materialmen's lien on the Real Property arises by operation of statute during any construction or repair of the Improvements, the Borrower shall either cause the lien to be discharged by paying when due any amounts owed to such persons, or shall comply with Section 12 of this Trust Deed.

5. REPRESENTATIONS OF THE BORROWER

The Borrower represents to the Lender as follows:

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5.1 FORMATION, EXISTENCE, GOOD STANDING

The Borrower is a limited liability company duly organized, validly existing and in good standing under the laws of Oregon.

5.2 POWER AND AUTHORITY

The Borrower has full power and authority to carry on its business as presently conducted, to own the Property, to execute and deliver the Loan Documents, and to perform its Obligations.

5.3 ANTI-TERRORISM REGULATIONS

No Borrower, Borrower Affiliate, or person owning an interest in the Borrower or any Borrower Affiliate, is either a "Specially Designated National" or a "Blocked Person" as those terms are defined in the Office of Foreign Asset Control Regulations (31 CFR Section 500 et seq.).

5.4 DUE AUTHORIZATION

The Loan transaction and the performance of all of the Borrower's Obligations have been duly authorized by all requisite limited liability company action, and each individual executing any Loan Document on behalf of the Borrower has been duly authorized to do so.

5.5 NO DEFAULT OR VIOLATIONS

The execution and performance of the Borrower's Obligations will not result in any breach of, or constitute a default under, any contract, agreement, document or other instrument to which the Borrower is a party or by which the Borrower may be bound or affected, and do not and will not violate or contravene any law to which the Borrower is subject; nor do any such other instruments impose or contemplate any obligations which are or will be inconsistent with the Loan Documents.

5.6 NO FURTHER APPROVALS OR ACTIONS REQUIRED

No approval by, authorization of, or filing with any federal, state or municipal or other governmental commission, board or agency or other governmental authority is necessary in connection with the authorization, execution and delivery of the Loan Documents by the Borrower.

5.7 DUE EXECUTION AND DELIVERY

Each of the Loan Documents to which the Borrower is a party has been duly executed and delivered on behalf of the Borrower.

5.8 LEGAL, VALID, BINDING AND ENFORCEABLE

Each of the Loan Documents to which the Borrower is a party constitutes the legal, valid and binding obligation of the Borrower, enforceable against the Borrower in accordance with its terms.

5.9 ACCURATE FINANCIAL INFORMATION

All financial information furnished by the Borrower to the Lender in connection with the application for the Loan is true, correct and complete in all material respects and does not omit to state any fact or circumstance necessary to make the statements in them not misleading, and there has been no material adverse change in the financial condition of the Borrower since the date of such financial information.

5.10 COMPLIANCE WITH LEGAL REQUIREMENTS

All governmental approvals and licenses required for the conduct of the Borrower's business and for the maintenance and operation of the Real Property in compliance with applicable law are in full force and effect, and the Real Property is currently being operated in compliance with the Legal Requirements in all material respects.

5.11 CONTRACTS AND FRANCHISES

All contracts and franchises necessary for the conduct of the Borrower's business and for the operation of the Real Property in accordance with good commercial practice are in force.

5.12 NO CONDEMNATION PROCEEDING

As of the date of this Trust Deed, the Borrower has no knowledge of any present, pending or threatened condemnation proceeding or award affecting the Real Property.

5.13 NO CASUALTY

As of the date of this Trust Deed, no damage to the Real Property by any fire or other casualty has occurred, other than damage that has been completely repaired in accordance with good commercial practice and in compliance with applicable law.

5.14 INDEPENDENCE OF THE REAL PROPERTY

The Real Property may be operated independently from other land and improvements not included within or located on the Land, and it is not necessary to own or control any property other than the Real Property in order to meet the obligations of the landlord under any Lease, or in order to comply with the Legal Requirements.

5.15 COMPLETE LOTS AND TAX PARCELS

The Land is comprised exclusively of tax parcels that are entirely included within the Land, and, if the Land is subdivided, of subdivision lots that are entirely included within the Land.

5.16 TENANT RIGHTS TO INSURANCE AND CONDEMNATION PROCEEDS

The AACI Lease does not grant to the Tenant a right to receive Insurance Proceeds or Condemnation Proceeds.

5.17 OWNERSHIP OF FIXTURES

The Borrower owns the Fixtures free of any encumbrances, including purchase money security interests, rights of lessors, and rights of sellers under conditional sales contracts or other financing arrangements.

5.18 COMMERCIAL PROPERTY

The Real Property is commercial rather than residential, and the Loan has not been made for personal, family or household purposes.

5.19 PERFORMANCE UNDER DEVELOPMENT AGREEMENTS

All of the obligations of the owner of the Real Property due under the Development Agreements have been fully, timely and completely performed and such performance has been accepted by the related governmental agency or utility company, and no Governmental Authority has alleged that any default exists under any of the Development Agreements.

5.20 STATUS OF CERTAIN TITLE MATTERS

Each of the Easements included within the Appurtenances (a) is valid and in full force and effect and may not be amended or terminated, except for cause, without the consent of the Borrower, (b) has not been amended or supplemented, (c) requires no approval of the Improvements that has not been obtained, (d) is free of defaults or alleged defaults, (e) does not provide for any assessment against the Real Property that has not been paid in full, and (f) has not been violated by the owner of the Real Property or, to the best of the Borrower's knowledge, by any tenant of the Real Property.

5.21 Non-Residential Property

This Trust Deed is not and will at all times continue not to be a residential trust deed, as that term is defined in ORS 86.705 (3).

5.22 NO PROHIBITED TRANSACTIONS

The Borrower represents to the Lender that either (a) the Borrower is not an "employee benefit plan" within the meaning of the Employee Retirement Income Security Act of

1974, as amended ("ERISA"), that is subject to Title I of ERISA, a "plan" within the meaning of Section 4975 of the Internal Revenue Code of 1986, as amended (the "Code"), or an entity that is deemed to hold "plan assets" within the meaning of 29 C.F.R. §2510.3-101 of any such employee benefit plan, or (b) the entering into of the Loan Documents, the acceptance of the Loan by the Borrower and the existence of the Loan will not result in a non-exempt prohibited transaction under §406 of ERISA or Section 4975 of the Code. The Borrower further warrants and covenants that the foregoing representation will remain true during the term of the Loan.

6. COVENANTS

6.1 GOOD STANDING

The Borrower shall remain in good standing as a limited liability company under the laws of Oregon and shall maintain in force all statements of fictitious name and registrations necessary for the lawful operation of its business in Oregon during the term of the Loan.

6.2 NO DEFAULT OR VIOLATIONS

The Borrower shall not enter into any contract, agreement, document or other instrument, if the performance of the Borrower's Obligations would result in any breach of, or constitute a default under, any such contract, agreement, document or other instrument, or if the contract, agreement, document or other instrument would impose or contemplate any obligations the performance of which would result in a Default under the Loan Documents or would be inconsistent with the performance of the Borrower's Obligations.

6.3 PAYMENT AND PERFORMANCE

The Borrower shall pay the Indebtedness and perform all of its other Obligations, as and when the Loan Documents require such payment and performance.

6.4 SPECIAL PURPOSE ENTITY

The Borrower has not and will not:

- (i) engage in any business or activity other than the ownership, operation and maintenance of the Property, and activities incidental thereto;
- (ii) acquire or own any assets other than (A) the Property, and (B) such incidental Personal Property as may be necessary for the operation of the Property;
- (iii) merge into or consolidate with any Person, or dissolve, terminate, liquidate in whole or in part, transfer or otherwise dispose of all or substantially all of its assets or change its legal structure;
- (iv) fail to observe all organizational formalities, or fail to preserve its existence as an entity duly organized, validly existing and in good standing (if applicable) under the Legal Requirements of the jurisdiction of its organization or formation, or

- amend, modify, terminate or fail to comply with the provisions of its organizational documents;
- (v) own any subsidiary, or make any investment in, any Person;
- (vi) commingle its assets with the assets of any other Person;
- (vii) incur any debt, secured or unsecured, direct or contingent (including guaranteeing any obligation), other than the Indebtedness, unsecured trade payables and unsecured equipment leases (both of which must be incurred in the ordinary course of business relating to the ownership and operation of the Property) provided the same (x) do not exceed at any time in the aggregate a maximum amount of three percent (3%) of the outstanding principal amount of the Note, and (y) are paid within sixty (60) days after the date incurred;
- (viii) fail to maintain its records, books of account, bank accounts, financial statements, accounting records and other entity documents separate and apart from those of any other Person;
- (ix) enter into any contract or agreement with any general partner, member, shareholder, principal or affiliate, except upon terms and conditions that are intrinsically fair and substantially similar to those that would be available on an arm's-length basis with unaffiliated third parties;
- maintain its assets in such a manner that it will be costly or difficult to segregate, ascertain or identify its individual assets from those of any other Person;
- (xi) assume or guaranty the debts of any other Person, hold itself out to be responsible for the debts of any other Person, or otherwise pledge its assets for the benefit of any other Person or hold out its credit as being available to satisfy the obligations of any other Person;
- (xii) make any loans or advances to any Person;
- (xiii) fail to file its own tax returns (unless prohibited by Legal Requirements from doing so);
- (xiv) fail either to hold itself out to the public as a legal entity separate and distinct from any other Person or to conduct its business solely in its own name or fail to correct any known misunderstanding regarding its separate identity;
- (xv) fail to maintain adequate capital for the normal obligations reasonably foreseeable in a business of its size and character and in light of its contemplated business operation;
- (xvi) fail to allocate shared expenses (including shared office space) and to use separate stationery, invoices and checks;
- (xvii) fail to pay its own liabilities (including salaries of its own employees) from its own funds; and
- (xviii) acquire obligations or securities of its partners, members, shareholders or other affiliates, as applicable.

6.5 PAYMENT OF IMPOSITIONS

The Borrower shall pay the Impositions on or before the last day on which they may be paid without penalty or interest, and shall, within thirty (30) days, furnish the Lender with a paid receipt or a cancelled check as evidence of payment. If the Lender does not receive such evidence, the Lender may obtain it directly. If it does so, the Lender will charge the Borrower an administrative fee of Two Hundred Fifty Dollars (\$250) for securing the evidence of payment. The payment of this fee shall be a demand obligation of the Borrower. The Borrower may meet the Imposition payment requirements of this Subsection 6.5 by remitting the Monthly Escrow Payments when due, by immediately providing Notice to the Lender of any new Imposition or increased Imposition unknown to the Lender, and by paying to the Lender on demand any amount required to increase the Escrow Fund to an amount sufficient to permit the Lender to pay all Impositions from the Escrow Fund on time. If the Borrower wishes to contest the validity or amount of an Imposition, it may do so by complying with Section 6.18. If any new Legal Requirement (other than a general tax on income or on interest payments) taxes the Trust Deed so that the yield on the Indebtedness would be reduced, and the Borrower may lawfully pay the tax or reimburse the Lender for its payment, the Borrower shall do so.

6.6 LEGAL CONTROL OF THE REAL PROPERTY

Under the terms of the Loan Documents, the Real Property shall remain under the Legal Control of the Permitted Control Group Members during the term of the Loan.

6.7 MAINTENANCE OF THE REAL PROPERTY

The Borrower shall not commit or permit any waste of the Real Property as a physical or economic asset, and agrees to maintain in good repair the Improvements, including structures, roofs, mechanical systems, parking lots or garages, and other components of the Real Property that are necessary or desirable for the use of the Real Property, or which the Borrower as landlord under any Lease is required to maintain for the benefit of any tenant. In its performance of this Obligation, the Borrower shall promptly and in a good and workmanlike manner repair or restore, as required under Subsection 6.18, any elements of the Improvements that are damaged or destroyed. The Borrower shall also replace roofs, parking lots, mechanical systems, and other elements of the Improvements requiring periodic replacement. The Borrower shall carry out such replacements no less frequently than would a commercially reasonable owner intending to maintain the maximum income-generating potential of the Real Property over its reasonable economic life. The Borrower shall not, without the prior written consent of the Lender, demolish, reconfigure, or materially alter the structural elements of the Improvements, unless such an action is the obligation of the Borrower under a Lease approved by Lender or for which the Lender's approval is not required under the Absolute Assignment of Leases and Rents. The Lender agrees that any request for its consent to such an action shall be deemed given if the Lender does not respond within fifteen (15) Business Days to any written request for such a consent, if the request is accompanied by all materials required to permit the Lender to analyze the proposed action.

6.8 USE OF THE REAL PROPERTY

The Borrower agrees that the Real Property may only be used as an office and warehouse property and for no other purpose.

6.9 LEGAL REQUIREMENTS

The Borrower shall maintain in full force and effect all governmental approvals and licenses required for the conduct of the Borrower's business and for the maintenance and operation of the Real Property in compliance with applicable law, and shall comply with all Legal Requirements relating to the Real Property at all times.

6.10 CONTRACTS AND FRANCHISES

The Borrower shall maintain in force all contracts and franchises necessary for the conduct of the Borrower's business and for the operation of the Real Property in accordance with good commercial practice.

6.11 COVENANTS REGARDING CERTAIN TITLE MATTERS

The Borrower shall promptly pay, perform and observe all of its obligations under the Easements included within the Appurtenances or under reciprocal easement agreements, operating agreements, declarations, and restrictive covenants included in the Permitted Encumbrances, shall not modify or consent to the termination of any of them without the prior written consent of the Lender, shall promptly furnish the Lender with copies of all notices of default under them, and shall cause all covenants and conditions under them and benefiting the Real Property to be fully performed and observed.

6.12 INDEPENDENCE OF THE REAL PROPERTY

The Borrower shall maintain the independence of the Real Property from other land and improvements not included within or located on the Land. In fulfilling this covenant, the Borrower shall neither take any action which would make it necessary to own or control any property other than the Real Property in order to meet the obligations of the landlord under any Lease, or in order to comply with the Legal Requirements, nor take any action which would cause any land or improvements other than the Land and the Improvements to rely upon the Land or the Improvements for those purposes.

6.13 COMPLETE LOTS AND TAX PARCELS

The Borrower shall take no action that would result in the inclusion of any portion of the Land in a tax parcel or subdivision lot that is not entirely included within the Land.

6.14 COMMERCIAL PROPERTY

The Real Property shall be used for commercial rather than for residential, personal, family or household purposes.

6.15 Performance under Development Agreements

The Borrower shall fully, timely and completely perform all of the obligations of the owner of the Real Property due under the Development Agreements and shall cause no default under any of the Development Agreements.

6.16 STATUS OF CERTAIN TITLE MATTERS

The Borrower shall not take or fail to take any action with respect to the Easements included within the Appurtenances or the reciprocal easement agreements, operating agreements, declarations, and restrictive covenants included in the Permitted Encumbrances if, as the result of such an action or failure, the subject Easement or other title matter would (a) be rendered invalid or without force or effect, (b) be amended or supplemented without the consent of the Lender, (c) be placed in default or alleged default, (d) result in any lien against the Real Property, or (e) give rise to any assessment against the Real Property, unless immediately paid in full.

6.17 NON-RESIDENTIAL PROPERTY

This Trust Deed shall at all times continue not to be a residential trust deed, as that term is defined in ORS 86.705 (3).

6.18 RESTORATION UPON CASUALTY OR CONDEMNATION

If a casualty or condemnation occurs, the Borrower shall promptly commence the Restoration of the Real Property, to the extent that the Lender has made Insurance Proceeds or Condemnation Proceeds available to the Borrower for such Restoration.

6.19 PERFORMANCE OF LANDLORD OBLIGATIONS

The Borrower shall perform its obligations as landlord under the Leases, and shall neither take any action, nor fail to take any action, if the action or failure would be inconsistent with the commercially reasonable management of the Real Property for the purpose of enhancing its long-term performance and value. The Borrower shall not, without the Lender's written consent, extend, modify, declare a default under, terminate, or enter into any Lease of the Real Property.

6.20 FINANCIAL REPORTS AND OPERATING STATEMENTS

(a) Maintenance of Books and Records

During the term of the Loan, the Borrower shall maintain complete and accurate accounting and operational records, including copies of all Leases and other material written contracts relating to the Real Property, copies of all tax statements, and evidence to support the payment of all material property-related expenses.

- (b) Delivery of Financial and Property-Related Information
 - Within one hundred twenty (120) days after the end of each of its fiscal years, or, if a Default exists, on demand by the Lender, the Borrower shall deliver to the Lender (A) copies of the financial statements of the Borrower, including balance sheets and earnings statements, (B) a complete and accurate operating statement for the Real Property, and (C) a complete rent roll, all in form satisfactory to the Lender. The rent roll must be certified by the Borrower to be true and correct and must include each tenant's name, premises, square footage occupied and leased, rent, lease expiration date, renewal options and related rental rates, delinquencies, vacancies, other income, expenses, and the existence of any unsatisfied landlord obligations, e.g. in respect of free rent periods, unfinished tenant improvements or other leasing costs. For so long as the AACI Lease is in force, the foregoing requirement may, in respect of the rent roll only, be satisfied by delivering a letter confirming (A) that the AACI Lease is in force and has not been modified except in accordance with the Loan Documents, (B) that, to the knowledge of the Borrower, no tenant default exists, and (C) that no material landlord default has been asserted in writing. If the Borrower fails to deliver the items required in this Subsection, the Lender may engage an accounting firm to prepare the required items. The Borrower shall cooperate fully with any investigative audit required to permit the accounting firm to produce these items, and the fees and expenses incurred in connection with their preparation shall be paid on demand by the
- If no Default exists and the Borrower fails to provide the financial and property reports required under this Section within one hundred twenty (120) days of the close of any fiscal year, the Lender will provide a Notice of this failure and a thirty (30)-day opportunity to cure before a Default shall exist. All monthly payments of principal and interest under the Note that become due after this cure period has elapsed but before the reports are received by the Lender must be accompanied by a fee of .000834 times the principal balance of the Loan at the beginning of the previous month, regardless of whether the Notice has asserted that the failure constitutes a Default under this Trust Deed. This fee is to compensate the Lender for (A) the increased risk resulting from the Lender's inability to monitor and service the Loan using up-to-date information, and (B) the reduced value and liquidity of the Loan as a financial asset.
- (d) Certification of Information

The financial and operating statements provided under this Subsection need not, as an initial matter, be certified by an independent certified public accountant as having been prepared in accordance with generally accepted accounting principles, consistently applied, or, in the case of financial statements prepared on a cash or income tax basis, or of operating statements, as not materially misleading based on an audit conducted in accordance with generally accepted auditing standards. The Borrower shall, however certify that such statements are

true and correct, and the Lender expressly reserves the right to require such a certification by an independent certified public accountant if a Default exists or if the Lender has reason to believe that any previously provided financial or operating statement is misleading in any material respect.

6.21 ESTOPPEL STATEMENTS

Upon request by the Lender, the Borrower shall, within ten (10) Business Days of Notice of the request, furnish to the Lender or to whom it may direct, a written statement acknowledging the amount of the Indebtedness and disclosing whether any offsets or defenses exist against the Indebtedness. Thereafter, the Borrower shall be estopped from asserting any other offsets or defenses alleged to have arisen as of the date of the statement.

6.22 PROHIBITION ON CERTAIN DISTRIBUTIONS

If a Default exists under Subsection 10.1 or under any of Subparagraphs (b), (c), (d), (e) or (f) of Subsection 10.2, the Borrower shall not pay any dividend or make any partnership, trust or other distribution, and shall not make any payment or transfer any property in order to purchase, redeem or retire any interest in its beneficial interests or ownership.

6.23 USE OF LOAN PROCEEDS

The Loan proceeds shall be used solely for commercial purposes.

6.24 PROHIBITION ON CUTOFF NOTICES

The Borrower shall not issue any Notice to the Lender to the effect that liens on the Real Property after the date of the Notice will enjoy priority over the lien of this Trust Deed.

6.25 PROHIBITED PERSON COMPLIANCE

Borrower warrants, represents and covenants that neither Borrower nor any Obligor nor any of their respective affiliated entities is or will be an entity or person (i) that is listed in the Annex to, or is otherwise subject to the provisions of, Executive Order 13224 issued on September 24, 2001 ("EO13224"), (ii) whose name appears on the United States Treasury Department's Office of Foreign Assets Control ("OFAC") most current list of "Specifically Designated National and Blocked Persons" (which list may be published from time to time in various mediums including, but not limited to, the OFAC website, http://www.treas.gov/ofac/t11sdn.pdf), (iii) who commits, threatens to commit or supports "terrorism", as that term is defined in EO 13224, or (iv) who is otherwise affiliated with any entity or person listed above (any and all parties or persons described in subparts [i] - [iv] above are herein referred to as a "Prohibited Person"). Borrower covenants and agrees that neither Borrower, nor any Obligor nor any of their respective affiliated entities will (i) conduct any business, nor engage in any transaction or dealing, with any Prohibited Person, including, but not limited to, the making or receiving of any contribution of funds, goods, or services to or for the benefit of a Prohibited Person, or

(ii) engage in or conspire to engage in any transaction that evades or avoids, or has the purpose of evading or avoiding, or attempts to violate, any of the prohibitions set forth in EO13224. Borrower further covenants and agrees to deliver (from time to time) to Lender any such certification or other evidence as may be requested by Lender in its sole and absolute discretion, confirming that (i) neither Borrower nor any Obligor is a Prohibited Person, and (ii) neither Borrower nor any Obligor has engaged in any business, transaction or dealings with a Prohibited Person, including, but not limited to, the making or receiving of any contribution of funds, goods, or services, to or for the benefit of a Prohibited Person.

7. INSURANCE REQUIREMENTS

At all times until the Indebtedness is paid in full, the Borrower shall maintain insurance coverage and administer insurance claims in compliance with this Section.

7.1 REQUIRED COVERAGES

- (a) Open Perils/Special Form/Special Perils Property

 The Borrower shall maintain "Open Perils," "Special Form," or "Special Perils" property insurance coverage in an amount not less than one hundred percent (100%) of the replacement cost of all insurable elements of the Real Property and of all tangible Personal Property, with coinsurance waived, or if a coinsurance clause is in effect, with an agreed amount endorsement acceptable to the Lender. Coverage shall extend to the Real Property and to all tangible Personal Property.
- (b) Broad Form Boiler and Machinery

 If any boiler or other machinery is located on or about the Real Property, the
 Borrower shall maintain broad form boiler and machinery coverage, including a
 form of business income coverage.
- (c) Flood

 If the Real Property is located in a special flood hazard area (that is, an area within the 100-year floodplain) according to the most current flood insurance rate map issued by the Federal Emergency Management Agency and if flood insurance is available, the Borrower shall maintain flood insurance coverage on all insurable elements of Real Property and of all tangible Personal Property.
- (d) Business Interruption

 The Borrower shall maintain a form of business income coverage in the amount of eighty percent (80%) of one year's business income from the Property.
- (e) Comprehensive/General Liability

 The Borrower shall maintain commercial general liability coverage (which may be in the form of umbrella/excess liability insurance) with a One Million Dollar

(\$1,000,000) combined single limit per occurrence and a minimum aggregate limit of Two Million Dollars (\$2,000,000).

(f) Liquor Liability

The Borrower shall maintain liquor liability coverage; if applicable law may impose liability on those selling, serving, or giving alcoholic beverages to others and if such beverages will be sold, served or given on the Real Property by the Borrower.

(g) Elective Coverages

The Lender may require additional coverages appropriate to the property type and site location. Additional coverages may include earthquake, windstorm, mine subsidence, sinkhole, personal property, supplemental liability, or coverages of other property-specific risks.

(h) Waiver of Earthquake Coverage Requirement

The Lender agrees that no earthquake coverage shall be required unless the Real Property is now or in the future located in a Seismic Zone III, IV or its equivalent, that is, a zone where major damage may occur, and that is adjacent to a major fault system. If such a requirement is imposed, the Borrower may at its expense obtain a study, prepared by a consultant approved in advance by the Lender, opining that the probable maximum loss in the event of an earthquake would be less than twenty-five percent (25%) of the value of the Real Property. If such a study is obtained, the Lender will waive its requirement.

7.2 PRIMARY COVERAGE

Each coverage required under this Section shall be primary rather than contributing or secondary to the coverage Borrower may carry for other properties or risks, <u>provided</u>, <u>however</u>, that blanket coverage shall be acceptable if (a) the policy includes limits by property location, and (b) the Lender determines, in the exercise of its sole and absolute discretion, that the amount of such coverage is sufficient in light of the other risks and properties insured under the blanket policy.

7.3 HOW THE LENDER SHALL BE NAMED

On all property insurance policies and coverages required under this Section (including coverage against loss of business income), the Lender must be named as "first mortgagee" under a standard mortgagee clause. On all liability policies and coverages, the Lender must be named as an "additional insured." The Lender shall be referred to verbatim as follows: "Transamerica Life Insurance Company, and its successors, assigns, and affiliates; as their interest may appear; c/o AEGON USA Realty Advisors, Inc.; Mortgage Loan Dept.; 4333 Edgewood Rd., NE; Cedar Rapids, Iowa 52499-5443."

7.4 RATING

Each insurance carrier providing insurance required under this Section must have, independently of its parent's or any reinsurer's rating, a General Policyholder Rating of

A, and a Financial Rating of VIII or better, as reported in the most current issue of Best's Insurance Guide, or as reported by Best on its internet web site.

7.5 DEDUCTIBLE

The maximum deductible on each required coverage or policy is Fifty Thousand Dollars (\$50,000).

7.6 NOTICES, CHANGES AND RENEWALS

All policies must require the insurance carrier to give the Lender a minimum of ten (10) days' notice in the event of modification, cancellation or termination for non payment of premium and a minimum of thirty (30) days' notice of non renewal. The Borrower shall report to the Lender immediately any facts known to the Borrower that may adversely affect the appropriateness or enforceability of any insurance contract, including, without limitation, changes in the ownership or occupancy of the Real Property, any hazard to the Real Property and any matters that may give rise to any claim. Prior to expiration of any policy required under this Section, the Borrower shall provide either (a) an original or certified copy of the renewed policy, or (b) a "binder," an Acord 28 (real property), Acord 27 (personal property) or Acord 25 (liability) certificate, or another document satisfactory to the Lender conferring on the Lender the rights and privileges of mortgagee. If the Borrower meets the foregoing requirement under clause (b), the Borrower shall supply an original or certified copy of the original policy within ninety (90) days. All binders, certificates, documents, and original or certified copies of policies must name the Borrower as a named insured or as an additional insured, must include the complete and accurate property address and must bear the original signature of the issuing insurance agent.

7.7 UNEARNED PREMIUMS

If this Trust Deed is foreclosed, the Lender may at its discretion cancel any of the insurance policies required under this Section and apply any unearned premiums to the Indebtedness.

7.8 INSURANCE DISCLOSURE NOTICE

UNLESS THE BORROWER PROVIDES LENDER WITH EVIDENCE OF INSURANCE COVERAGE AS REQUIRED BY THIS TRUST DEED, THE LENDER MAY PURCHASE INSURANCE AT THE BORROWER'S EXPENSE TO PROTECT ITS INTEREST. THIS INSURANCE MAY, BUT NEED NOT, ALSO PROTECT THE BORROWER'S INTEREST. IF THE IMPROVEMENTS BECOME DAMAGED, THE COVERAGE THE LENDER PURCHASES MAY NOT PAY ANY CLAIM THE BORROWER MAKES OR ANY CLAIM MADE AGAINST THE BORROWER. THE BORROWER MAY LATER CANCEL THIS COVERAGE BY PROVIDING THE LENDER WITH EVIDENCE THAT IT HAS OBTAINED PROPERTY COVERAGE ELSEWHERE. THE BORROWER IS RESPONSIBLE FOR THE COST OF ANY INSURANCE PURCHASED BY THE LENDER. THE COST OF THIS INSURANCE

MAY BE ADDED TO THE INDEBTEDNESS. IF THE COST IS ADDED TO THE INDEBTEDNESS, THE DEFAULT RATE SHALL APPLY TO THIS ADDED AMOUNT. THE EFFECTIVE DATE OF COVERAGE MAY BE THE DATE ANY PRIOR COVERAGE LAPSED OR THE DATE BORROWER FAILED TO PROVIDE PROOF OF COVERAGE. THE COVERAGE LENDER OBTAINS MAY BE CONSIDERABLY MORE EXPENSIVE THAN INSURANCE THE BORROWER MIGHT HAVE OBTAINED ON ITS OWN AND MAY NOT SATISFY ANY NEED FOR PROPERTY DAMAGE COVERAGE OR ANY MANDATORY LIABILITY INSURANCE REQUIREMENTS IMPOSED BY APPLICABLE LAW.

8. INSURANCE AND CONDEMNATION PROCEEDS

8.1 PROVISIONS OF APPROVED AACI LEASE TO GOVERN

The Lender agrees to permit the use of Insurance Proceeds and Condemnation Proceeds consistently with the terms of the AACI Lease approved by the Lender at the time of the origination of the Loan if no Default exists, if the Borrower is obligated under the AACI Lease to effect the Restoration of the Real Property, if the Lender may hold the Insurance Proceeds or Condemnation Proceeds and condition their disbursement as described in Subsections 8.5 and 8.7, and if the Tenant under the AACI Lease confirms to the Lender in writing that it is committed to pay full Rent following the completion of the Restoration. The remaining provisions of this Section shall apply to the extent that they are consistent with the terms of the approved AACI Lease.

8.2 ADJUSTMENT AND COMPROMISE OF CLAIMS AND AWARDS

The Borrower may settle any insurance claim or condemnation proceeding if the effect of the casualty or the condemnation may be remedied for \$50,000 or less. If a greater sum is required, the Borrower may not settle any such claim or proceeding without the advance written consent of the Lender. If a Default exists, the Borrower may not settle any insurance claim or condemnation proceeding without the advance written consent of the Lender.

8.3 DIRECT PAYMENT TO THE LENDER OF PROCEEDS

If the Insurance Proceeds received in connection with a casualty or the Condemnation Proceeds received in respect of a condemnation exceed \$50,000, or if there is a Default, then such proceeds shall be paid directly to the Lender. The Lender shall have the right to endorse instruments which evidence proceeds that it is entitled to receive directly.

8.4 AVAILABILITY TO THE BORROWER OF PROCEEDS

The Borrower shall have the right to use the Insurance Proceeds or the Condemnation Proceeds to carry out the Restoration of the Real Property, if the amount received is less than Two Hundred Fifty Thousand Dollars (\$250,000), subject to the conditions set forth in Subsections 8.5, 8.6, and 8.7 of this Section.

If the amount received in respect of a casualty or condemnation equals or exceeds Two Hundred Fifty Thousand Dollars (\$250,000), and if the Loan-to-Value ratio of the Property on completion will be seventy-five percent (75%) or less, as determined by the Lender in its discretion based on its estimate of the market value of the Real Property, the Lender shall receive such Insurance Proceeds or Condemnation Proceeds directly and hold them in a fund for Restoration subject to the conditions set forth in Subsections 8.5, 8.6, and 8.7 of this Section. If the Lender's estimate of the market value of the Real Property implies a Loan-to-Value ratio of over seventy-five percent (75%), and the Borrower disagrees with the Lender's estimate, the Borrower may require that the Lender engage an independent appraiser (the "Fee Appraiser") to prepare and submit to AEGON a full narrative appraisal report estimating the market value of the Real Property. The Fee Appraiser shall be certified in Oregon and shall be a member of a national appraisal organization that has adopted the Uniform Standards of Professional Appraisal Practice (USPAP) established by the Appraisal Standards Board of the Appraisal Foundation. The Fee Appraiser will be required to use assumptions and limiting conditions established by the Lender and to prepare the appraisal in conformity with the Lender's Appraisal Guidelines. For purposes of this Section, the independent appraiser's value conclusion shall be binding on both the Lender and the Borrower. The Borrower shall have the right to make a prepayment of the Loan, without premium, sufficient to achieve this Loan-to-Value ratio. The independent fee appraisal shall be at the Borrower's expense, and the Borrower shall pay to the Lender an administrative fee of Two Thousand Five Hundred Dollars (\$2,500) in connection with its review. The Lender may require that the Borrower deposit Ten Thousand Dollars (\$10,000) with the Lender as security for these expenses or may pay the fee appraiser's and administrative fees from the proceeds at its sole discretion.

Unless the Borrower has the right to use the Insurance Proceeds or the Condemnation Proceeds under the foregoing paragraphs, the Lender may, in its sole and absolute discretion, either apply them to the Loan balance or disburse them for the purposes of repair and reconstruction, or to remedy the effects of the condemnation. No prepayment premium will be charged on Insurance Proceeds or Condemnation Proceeds applied to reduce the principal balance of the Loan.

8.5 CONDITIONS TO AVAILABILITY OF PROCEEDS

The Lender shall have no obligation to release Insurance Proceeds or Condemnation Proceeds to the Borrower, and may hold such amounts as additional security for the Loan, if (a) a Default exists under the Note or this Trust Deed, (b) a payment Default has occurred during the preceding twelve (12) months, or (c) if the Insurance Proceeds or Condemnation Proceeds received by the Lender and any other funds deposited by the Borrower with the Lender are insufficient, as determined by the Lender in its reasonable discretion, to complete the Restoration. If a Default exists, the Lender may at its sole and absolute discretion apply such Insurance Proceeds and Condemnation Proceeds to the full or partial cure of the Default.

8.6 PERMITTED MEZZANINE FINANCING FOR REBUILDING OR REMEDIATION OF THE EFFECT OF TAKING BY EMINENT DOMAIN

If the Lender reasonably determines that the Insurance Proceeds or Condemnation Proceeds received in respect of a casualty or condemnation, as the case may be, would be insufficient to permit the Borrower to restore the Improvements to their condition before the casualty, or to remedy the effect on the Real Property of the condemnation, then the Borrower shall use its best efforts to secure such additional funds as are necessary to effect the Restoration. Interests in the Borrower may be pledged as security to the extent necessary in connection with any such financing.

8.7 DRAW REQUIREMENTS

The Borrower's right to receive Insurance Proceeds and Condemnation Proceeds held by the Lender under this Section shall be conditioned on the Lender's approval of plans and specifications for the Restoration. Each draw shall be in the minimum amount of Fifty Thousand Dollars (\$50,000). Draw requests shall be accompanied by customary evidence of construction completion, and by endorsements to the Lender's mortgagee title insurance coverage insuring the absence of construction, mechanics' or materialmen's liens. Draws based on partial completion of the Restoration shall be subject to a ten percent (10%) holdback. All transactional expenses shall be paid by the Borrower.

9. ESCROW FUND

The Borrower shall pay the Monthly Escrow Payment on the first (1st) day of every month, commencing with the month in which the first regular payment of principal and interest is due. The Lender shall hold Monthly Escrow Payments in a non-interest-bearing fund from which the Lender will pay on a timely basis those Escrow Expenses that the Lender has anticipated will become payable on a regular basis during the Loan's term, and on which the Lender has based its determination of the Monthly Imposition Requirement, the Monthly Insurance Premium Requirement and the Monthly Reserve Requirement. The Escrow Fund will be maintained as an accounting entry in the Lender's general account, where it may be commingled with the Lender's other funds. The Lender may reanalyze the projected Escrow Expenses from time to time and shall advise the Borrower of any change in the amount of the Monthly Escrow Payment. Upon the foreclosure of this Trust Deed, the delivery of a deed in lieu of foreclosure, or the payoff of the Loan, the Lender shall apply amounts in the Escrow Fund, net of accrued Escrow Expenses, to the Indebtedness. The Lender shall remit any amounts in excess of the Indebtedness to the Borrower.

10. DEFAULT

10.1 PAYMENT DEFAULTS

A "Default" shall exist without Notice upon the occurrence of any of the following events:

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AAC Headquarter Building, Portland, Oregon AEGON Loan No. 89577 Seattle-3289047.2 0027988-00443

(a) Scheduled Payments

The Borrower's failure to pay, or to cause to be paid, (i) any regular monthly payment of principal and interest under the Note, together with any required Monthly Escrow Payment, on or before the tenth (10th) day of the month in which it is due, or (ii) any other scheduled payment under the Note, this Trust Deed or any other Loan Document.

(b) Payment at Maturity

The Borrower's failure to pay, or to cause to be paid, the Indebtedness when the Loan matures by acceleration under <u>Section 16</u>, because of a transfer or encumbrance under <u>Section 13</u>, or by lapse of time.

(c) Demand Obligations

The Borrower's failure to pay, or to cause to be paid, within five (5) Business Days of the Lender's demand, any other amount required under the Note, this Trust Deed or any of the other Loan Documents.

10.2 INCURABLE NONMONETARY DEFAULT

A Default shall exist upon any of the following:

(a) Material Untruth or Misrepresentation

The Lender's discovery that any representation made by the Borrower in any Loan Document was materially untrue or misleading when made, if the misrepresentation either was intentional or is not capable of being cured as described in <u>Subsection 1.1(i)(a)</u> below.

(b) Due on Sale or Encumbrance

The occurrence of any sale, conveyance, transfer or vesting or any Prohibited Structural Change that would result in the Loan becoming immediately due and payable at the Lender's option under <u>Section 13</u>.

(c) Voluntary Bankruptcy Filing

The filing by the Borrower or any Guarantor of a petition in bankruptcy or for relief from creditors under any present or future law that affords general protection from creditors.

(d) Insolvency

The failure of the Borrower generally to pay its debts as they become due, its admission in writing to an inability so to pay its debts, the making by the Borrower of a general assignment for the benefit of creditors, or a judicial determination that the Borrower is insolvent.

(e) Receivership

The appointment of a receiver or trustee to take possession of any of the assets of the Borrower.

- (f) Levy or Attachment

 The taking or seizure of any material portion of the Property under levy of execution or attachment.
- The filing against the Real Property of any lien or claim of lien for the performance of work or the supply of materials, or the filing of any federal, state or local tax lien against the Borrower, or against the Real Property, unless the Borrower promptly complies with Section 12 of this Trust Deed.
- (h) Defaults under other Loan Documents
 The existence of any default under any other Loan Document, provided any required Notice of such default has been given and any applicable cure period has expired.
- (i) Dissolution or Liquidation

 The Borrower shall initiate or suffer the commencement of a proceeding for its dissolution or liquidation, and such proceeding shall not be dismissed within thirty (30) days, or the Borrower shall cease to exist as a legal entity (unless resulting in a Permitted Transfer).

10.3 CURABLE NON-MONETARY DEFAULT

A Default shall exist, following the cure periods specified below, under the following circumstances:

- (a) Unintentional Misrepresentations that are Capable of Being Cured

 A "Default" shall exist, with Notice, if the Lender discovers that the Borrower has unintentionally made any material misrepresentation that is capable of being cured, unless the Borrower promptly commences and diligently pursues a cure of the misrepresentation approved by the Lender, and completes the cure within thirty (30) days. Any such cure shall place the Lender in the risk position that would have existed had the false representation been true when made.
- The Borrower or any Guarantor becomes the subject of any petition or action seeking to adjudicate it bankrupt or insolvent, or seeking liquidation, winding up, reorganization, arrangement, adjustment, protection, relief, or composition of it or its debts under any law relating to bankruptcy, insolvency or reorganization or relief, or that may result in a composition of its debts, provide for the marshaling of the Borrower's or any Guarantor's assets for the satisfaction of its debts, or result in the judicially ordered sale of the Borrower's or any Guarantor's assets for the purpose of satisfying its obligations to creditors, unless a motion for the dismissal of the petition or other action is filed within ten (10) days and results in its dismissal within sixty (60) days of the filing of the petition or other action.

(c) Entry of a Material Judgment

Any judgment is entered against the Borrower or any other Obligor, and the judgment may materially and adversely affect the value, use or operation of the Real Property, unless the judgment is satisfied within ten (10) Business Days.

(d) Other Defaults

The Borrower fails to observe any promise or covenant made in this Trust Deed, unless the failure results in a Default described elsewhere in this Section 10, provided the Lender delivers written Notice to the Borrower of the existence of such an act, omission or circumstance, and that such an act, omission or circumstance shall constitute a Default under the Loan Documents unless the Borrower promptly initiates an effort to cure the potential Default, pursues the cure diligently and continuously, and succeeds in effecting the cure within one hundred twenty (120) days of it is given Notice. The Lender shall afford the Borrower an additional period of one hundred twenty (120) days in cases where construction or repair is needed to cure the potential Default, and the cure cannot be completed within the first one hundred twenty (120) day cure period. During the cure period, the Borrower has the obligation to provide on demand satisfactory documentation of its effort to cure, and, upon completion, evidence that the cure has been achieved. All notice and cure periods provided in this Trust Deed shall run concurrently with any notice or cure periods provided by law and in any of the other Loan Documents.

11. RIGHT TO CURE

The Lender shall have the right to cure any Default. The expenses of doing so shall be part of the Indebtedness, and the Borrower shall pay them to the Lender on demand.

12. CONTEST RIGHTS

The Borrower may secure the right to contest Impositions and construction, mechanics' or materialmen's liens, through appropriate proceedings conducted in good faith, by either (A) depositing with the Lender an amount equal to one hundred twenty-five percent (125%) of the amount of the Imposition or the lien, or (B) obtaining and maintaining in effect a bond issued by a surety acceptable to the Lender, in an amount equal to the greater of (i) the amount of a required deposit under clause (A) above, and (ii) the amount required by the surety or by the court in order to obtain a court order staying the foreclosure of the lien pending resolution of the dispute, and releasing the lien of record. The proceeds of such a bond must be payable directly to the Lender. The surety issuing such a bond must be acceptable to the Lender in its sole discretion. After such a deposit is made or bond issued, the Borrower shall promptly commence the contest of the lien and continuously pursue that contest in good faith and with reasonable diligence. If the contest of the related Imposition or lien is unsuccessful, any deposits or bond proceeds shall be used to pay

the Imposition or to satisfy the obligation from which the lien has arisen. Any surplus shall be refunded to the Borrower.

13. DUE ON TRANSFER OR ENCUMBRANCE

Upon the sale or transfer of any portion of the Real Property or any other conveyance, transfer or vesting of any direct or indirect interest in the Borrower or the Property, including (i) the direct or indirect transfer of, or the granting of a security interest in, the ownership of the Borrower, (ii) any encumbrance (other than a Permitted Encumbrance) of the Real Property (unless the Borrower contests the encumbrance in compliance with Section 12), and (iii) the lease, license or granting of any security interest in the Personal Property, the Indebtedness shall, at the Lender's option, become immediately due and payable upon Notice to the Borrower, unless the sale, conveyance, transfer or vesting is a Permitted Transfer or is permitted by Section 8.6.

14. DUE ON SALE EXCEPTIONS

14.1 PERMITTED TRANSFER TO AN APPROVED PURCHASER

The Borrower shall have the right, on one occasion during the term of the Loan, to sell or transfer the Property in a transaction approved by the Lender. The Lender agrees that such a transfer shall be a Due on Sale Exception if the following conditions are satisfied:

- (a) No Default
 - No Default shall exist, and no act, omission or circumstance shall exist which, if uncured following Notice and the passage of time, would become a Default.
- (b) Request and Supporting Materials
 - The Lender shall receive a written request for its approval at least ninety (90) days before the proposed transfer. The request shall specify the identity of the proposed transferee and the purchase price and other terms of the transaction, shall include a copy of the proposed contract of sale, and shall be accompanied by the financial statements, tax returns, and organizational documents of the proposed transferee and its principals.
- (c) Criteria to be Considered
 - The ownership structure, financial strength, credit history and demonstrated property management expertise of the proposed transferee and its principals shall be satisfactory to the Lender in its sole discretion. The Lender expressly reserves the right to withhold its approval of the proposed transfer if the proposed transferee or any of its principals is or has been the subject of any bankruptcy, insolvency, or similar proceeding.

(d) Assumption Agreement

Under the terms of the proposed transfer, the proposed transferee shall assume the Loan, without modification, under the terms of an assumption agreement and additional documentation satisfactory to the Lender in form and substance. Under the assumption agreement, the transferee shall provide a representation as to the purchase price paid for the Real Property.

(e) Retention of Recourse Obligations

Under the terms of the assumption agreement and additional documentation, liability for the recourse obligations arising after the date of the transfer and assumption shall be assumed by the proposed transferee. Those liable for the recourse obligations arising before the transfer and assumption will not be released from the recourse obligations arising before or after the date of the transfer and assumption except at Lender's sole discretion. The principals of the proposed transferee shall also assume and be jointly and severally liable with the Guarantor under the Payment Guarantee executed by Guarantor.

(f) Title Insurance Endorsement

The Borrower shall agree to provide an endorsement to the Lender's mortgagee title insurance policy, insuring the continued validity and priority of this Trust Deed following the assumption.

(g) Assumption Fee

The Lender shall receive an assumption fee of one percent (1%) of the outstanding balance of the Loan, and the Borrower shall agree to reimburse the Lender's out-of-pocket expenses incurred in connection with the proposed transfer, including title updates and endorsement charges, recording fees, any applicable taxes and attorneys' fees, regardless of whether the transfer is consummated.

14.2 PERMITTED TRANSFERS OF CERTAIN PASSIVE INTERESTS

The Lender agrees that it shall not unreasonably withhold its consent to certain transfers of direct or indirect interests in the Borrower (each a "Qualified Passive Interest Transfer"). A "Qualified Passive Interest Transfer" is any transfer of a direct or indirect interest in the Borrower, if, following the transfer (i) the Real Property remains under the Legal Control of all of the Permitted Control Group Members, (ii) the transfer does not result in a Prohibited Structural Change, and (iii) the transfer either (A) does not result in a change in assets that would be at risk with respect to any recourse obligations, or (B) is a transfer of direct interests in the Borrower to the devisees of the estate of a deceased Guarantor and any remaining or replacement Guarantors collectively meet the Net Worth Requirement.

14.3 ESTATE PLANNING TRANSFERS

A transfer for estate planning purposes of direct or indirect interests in the Borrower to a trust for the benefit of Permitted Control Group Members or members of their immediate

families shall be permitted, if the transfer does not result in a change of Legal Control or management control of the Real Property, does not reduce the assets at risk with respect to any recourse obligations, and does not change the identity or capacity of any controlling entity in the ownership structure.

14.4 TRANSACTION COSTS

The Borrower shall pay all out-of-pocket expenses incurred by the Lender in the review and processing of a proposed or completed Permitted Transfer, regardless of whether the Permitted Transfer is carried out.

15. NOTICE OF ABSOLUTE ASSIGNMENT OF LEASES AND RENTS

Under the Absolute Assignment of Leases and Rents, the Borrower has assigned to the Lender, and to its successors and assigns, all of the Borrower's right and title to, and interest in, the Leases, including all rights under the Leases and all benefits to be derived from them. The rights assigned include all authority of the Borrower to modify or terminate Leases, or to exercise any remedies, and the benefits assigned include all Rents. This assignment is present and absolute, but under the terms of the Absolute Assignment of Leases and Rents, the Lender has granted the Borrower a conditional license to collect and use the Rents, and to exercise the rights assigned, in a manner consistent with the Obligations, all as more particularly set forth in the Absolute Assignment of Leases and Rents. The Lender may, however, terminate the license by written Notice to the Borrower on certain conditions set forth in the Absolute Assignment of Leases and Rents.

16. ACCELERATION

If a Default exists, the Lender may, at its option, declare the unpaid principal balance of the Note to be immediately due and payable, together with all accrued interest on the Indebtedness, all costs of collection (including reasonable attorneys' fees and expenses) and all other charges due and payable by the Borrower under the Note or any other Loan Document. If the subject Default has arisen from a failure by the Borrower to make a regular monthly payment of principal and interest, the Lender shall not accelerate the Indebtedness unless the Lender shall have given the Borrower at least three (3) Business Days' advance Notice of its intent to do so.

If the subject Default is curable and nonmonetary in nature, the Lender shall exercise its option to accelerate only by giving Notice of acceleration to the Borrower. The Lender shall not give any such Notice of acceleration until (a) the Borrower has been given any required Notice of the prospective Default, and (b) any applicable cure period has expired.

Except as expressly described in this Section, no notice of acceleration shall be required in order for the Lender to exercise its option to accelerate the Indebtedness in the event of Default.

17. RIGHTS OF ENTRY AND TO OPERATE

17.1 ENTRY ON REAL PROPERTY

If a Default exists, the Lender may, to the extent permitted by law, enter upon the Real Property and take exclusive possession of the Real Property and of all books, records and accounts, all without Notice and without being guilty of trespass, but subject to the rights of tenants in possession under the Leases. If the Borrower remains in possession of all or any part of the Property after Default and without the Lender's prior written consent, the Lender may, without Notice to the Borrower, invoke any and all legal remedies to dispossess the Borrower.

17.2 OPERATION OF REAL PROPERTY

Following Default, the Lender may hold, lease, manage, operate or otherwise use or permit the use of the Real Property, either itself or by other persons, firms or entities, in such manner, for such time and upon such other terms as the Lender may deem to be prudent under the circumstances (making such repairs, alterations, additions and improvements thereto and taking any and all other action with reference thereto, from time to time, as the Lender deems prudent), and apply all Rents and other amounts collected by the Lender in accordance with the provisions of the Absolute Assignment of Leases and Rents.

18. RECEIVERSHIP

Following Default, the Lender may apply to a court of competent jurisdiction for the appointment of a receiver of the Property, ex parte without Notice to the Borrower, whether or not the value of the Property exceeds the Indebtedness, whether or not waste or deterioration of the Real Property has occurred, and whether or not other arguments based on equity would justify the appointment. The Borrower irrevocably, with knowledge and for valuable consideration, consents to such an appointment. Any such receiver shall have all the rights and powers customarily given to receivers in Oregon, including the rights and powers granted to the Lender by this Trust Deed, the power to maintain, lease and operate the Real Property on terms approved by the court, and the power to collect the Rents and apply them to the Indebtedness or otherwise as the court may direct. Once appointed, a receiver may at the Lender's option remain in place until the Indebtedness has been paid in full.

19. FORECLOSURE; POWER OF SALE

19.1 RIGHT TO FORECLOSE

Upon the occurrence of a Default, Beneficiary may immediately proceed to foreclose the lien of this Trust Deed against all or part of the Real Property by judicial or nonjudicial foreclosure in accordance with the laws of Oregon.

19.2 Non-Judicial Foreclosure

Upon the occurrence of a Default and written request of Beneficiary, Trustee shall sell the Property, or any part thereof, in accordance with the Trust Deed Act of the State of Oregon and the UCC of the State of Oregon where applicable, without regard to any right of marshaling of assets, at public auction to the highest bidder for cash at such time and at such place as are statutorily prescribed. In connection with any sales hereunder Trustee may elect to sell any Fixtures or Personal Property encumbered by this Trust Deed at the same sale as the Real Property or to dispose of the same in one or more separate sales in accordance with applicable law. Any sale of any Personal Property hereunder shall be conducted in any manner permitted by the UCC of the State of Oregon. Trustor acknowledges that there is no right to an extension of the Trustee's sale on "equitable" or other grounds, and that Beneficiary's remedies under this Trust Deed shall not be affected or impaired by the exercise of any right of setoff or to collect and apply rents, profits, insurance proceeds or condemnation awards. Any person except Trustee may bid at a Trustee's sale. Subject to applicable law, Trustee shall apply the proceeds of the sale in the following order: (1) to the expense of sale, including a reasonable Trustee's fee and attorneys' fees; (2) to the obligation secured by this Trust Deed; (3) the surplus, if any, shall be distributed in accordance with said Trust Deed Act. Trustee shall deliver to the purchaser at the sale its deed, without warranty, which shall convey to the purchaser the interest in the Property which Trustor had or had the power to convey at the time of Trustor's execution of this Trust Deed, and such as Trustor may have acquired thereafter. Trustee's deed shall recite the facts showing that the sale was conducted in compliance with all the requirements of law and of this Trust Deed, which recital shall be prima facie evidence of such compliance and conclusive evidence thereof in favor of bona fide purchaser and encumbrancers for value. The Trustee is not obligated to notify any party hereto of pending sale under any other Trust Deed or of any action or proceeding in which Trustor, Trustee or Beneficiary shall be a party, unless such action or proceeding is brought by the Trustee.

20. WAIVERS

To the maximum extent permitted by law, the Borrower irrevocably and unconditionally WAIVES and RELEASES any present or future rights (a) of reinstatement or redemption, (b) that may exempt the Property from any civil process, (c) to appraisal or valuation of the Property, (d) to extension of time for payment, (e) that may subject the Lender's exercise of its remedies to the administration of any decedent's estate or to any partition or liquidation action, (f) to any homestead and exemption rights provided by the Constitution and laws of the United States and of Oregon, (g) to notice of acceleration or notice of intent to accelerate (other than as expressly stated herein), and (h) that in any way would delay or defeat the right of the Lender to cause the sale of the Real Property for the purpose of satisfying the Indebtedness. The Borrower agrees that the price paid at a lawful foreclosure sale, whether by the Lender or by a third party, and whether paid through cancellation of all or a portion of the Indebtedness or in cash, shall conclusively establish the value of the Real Property.

The foregoing waivers shall apply to and bind any party assuming the Obligations of the Borrower under this Trust Deed.

21. SECURITY AGREEMENT AND FIXTURE FILING

21.1 DEFINITIONS

- "Account" shall have the definition assigned in the UCC.
- "Chattel Paper" shall have the definition assigned in the UCC.
- "Deposit Account" shall have the definition assigned in the UCC.
- "Document" shall have the definition assigned in the UCC.
- "Equipment" shall have the definition assigned in the UCC.
- "Financing Statements" shall have the definition assigned in the UCC.
- "General Intangibles" shall have the definition assigned in the UCC.
- "Goods" shall have the definition assigned in the UCC. "Goods" include all detached Fixtures, items of Personal Property that may become Fixtures, property management files, accounting books and records, reports of consultants relating to the Real Property, site plans, test borings, environmental or geotechnical surveys, samples and test results, blueprints, construction and shop drawings, and plans and specifications.
- "Instrument" shall have the definition assigned in the UCC.
- "Investment Property" shall have the definition assigned in the UCC.
- "Letter of Credit" shall have the definition assigned in the UCC.
- "Letter of Credit Rights" shall have the definition assigned in the UCC.
- "Money Collateral" means all money received in respect of Rents.
- "Personal Property" means Accounts, Chattel Paper, Deposit Accounts, Documents, Equipment, Goods, Instruments, General Intangibles, Investment Property, Letter of Credit Rights, Letters of Credit, and Money Collateral.
- "Proceeds" shall have the meaning assigned in the UCC.
- "UCC" means the Uniform Commercial Code as adopted in Oregon.

21.2 CREATION OF SECURITY INTEREST

This Trust Deed shall be self-operative and shall constitute a security agreement pursuant to the provisions of the UCC with respect to the Personal Property. The Borrower, as debtor, hereby grants the Lender, as secured party, for the purpose of securing the Indebtedness, a security interest in the Accounts, Chattel Paper, Deposit Accounts, Documents, Equipment, Goods, Instruments, General Intangibles, Investment Property, Letter of Credit Rights, Letters of Credit, and Money Collateral, in the accessions, additions, replacements, substitutions and Proceeds of any of the foregoing items of collateral. Upon Default, the Lender shall have the rights and remedies of a secured party under the UCC as well as all other rights and remedies available at law or in equity, and, at the Lender's option, the Lender may also invoke the remedies provided elsewhere in this Trust Deed as to such Property. The Borrower and the Lender agree that the rights granted to the Lender as secured party under this Section 21 are in addition to rather than a limitation on any of the Lender's other rights under this Trust Deed with respect to the Property.

21.3 FILING AUTHORIZATION

The Borrower irrevocably authorizes the Lender to file, in the appropriate locations for filings of UCC financing statements in any jurisdictions as the Lender in good faith deems appropriate, such financing statements and amendments as the Lender may require in order to perfect or continue this security interest, or in order to prevent any filed financing statement from becoming misleading or from losing its perfected status.

21.4 ADDITIONAL SEARCHES AND DOCUMENTATION

Borrower shall provide to Lender upon request, certified copies of any searches of UCC records deemed necessary or appropriate by Lender to confirm the first priority status of its security interest in the Personal Property, together with copies of all documents or records evidencing security interests disclosed by such searches.

21.5 Costs

The Borrower shall pay all filing fees and costs and all reasonable costs and expenses of any record searches (or their continuations) as the Lender may require.

21.6 REPRESENTATIONS, WARRANTIES AND COVENANTS OF THE BORROWER

(a) Ownership of the Personal Property

All of the Personal Property is, and shall during the term of the Loan continue to be, owned by the Borrower, and is not the subject matter of any lease, control agreement or other instrument, agreement or transaction whereby any ownership, security or beneficial interest in the Personal Property is held by any person or entity other than the Borrower, subject only to (1) the Lender's security interest, (2) the rights of tenants occupying the Property pursuant to Leases approved by the Lender, and (3) the Permitted Encumbrances.

(b) No Other Identity

The Borrower represents and warrants that the Borrower has not used or operated under any other name or identity for at least five (5) years. The Borrower covenants and agrees that Borrower will furnish Lender with notice of any change in its name, form of organization, or state of organization within thirty (30) days prior to the effective date of any such change.

(c) Location of EquipmentAll Equipment is located upon the Land.

(d) Removal of Goods

The Borrower will not remove or permit to be removed any item included in the Goods from the Land, unless the same is replaced immediately with unencumbered Goods (1) of a quality and value equal or superior to that which it replaces, and (2) which is located on the Land. All such replacements, renewals, and additions shall become and be immediately subject to the security interest of this Trust Deed.

(e) Proceeds

The Borrower may, without the Lender's prior written consent, dispose of Goods in the ordinary course of business, provided that, following the disposition, the perfection of the Lender's security interest in the Proceeds of the disposition will continue under § 9-315 (d) of the UCC. The Borrower shall not, without the Lender's prior written consent, dispose of any Personal Property in any other manner, except in compliance with <u>Subsection 21.6(d)</u> above.

21.7 FIXTURE FILING

This Trust Deed constitutes a financing statement filed as a fixture filing in the Official Records of the County Clerk of Multnomah County, Oregon, with respect to any and all fixtures comprising Property. The "debtor" is Advanced American Construction Properties, LLC, an Oregon limited liability company, the "secured party" is Transamerica Life Insurance Company, an Iowa corporation, the collateral is as described in Subsection 21.1 above and the granting clause of this Trust Deed, and the addresses of the debtor and secured party are the addresses stated in Subsection 25.13 of this Trust Deed for Notices to such parties. The organizational identification number of the debtor is 236994-99. The owner of record of the Real Property is Advanced American Construction Properties, LLC.

22. ENVIRONMENTAL MATTERS

22.1 REPRESENTATIONS

The Borrower represents as follows:

(a) No Hazardous Substances

To the best of the Borrower's knowledge, and except as disclosed in the ESA, no release of any Hazardous Substance has occurred on or about the Real Property in a quantity or at a concentration level that (i) violates any Environmental Law, or (ii) requires reporting to any regulatory authority or may result in any obligation to remediate under any Environmental Law.

(b) Absence of Mold Contamination

To the best of the Borrower's knowledge, the amount of mold present in the air within the Improvements and the extent of mold growth on the elements of the Improvements are no greater than normal in buildings free of moisture intrusion. No mold-related tenant complaint or legal proceeding relating to the Improvements exists, except as otherwise disclosed to AEGON in writing

(c) Compliance with Environmental Laws

The Real Property and its current use and presently anticipated uses comply with all Environmental Laws, including those requiring permits, licenses, authorizations, and other consents and approvals.

(d) No Actions or Proceedings

No governmental authority or agency has commenced any action, proceeding or investigation based on any suspected or actual violation of any Environmental Law on or about the Real Property. To the best of the Borrower's knowledge, no such authority or agency has threatened to commence any such action, proceeding, or investigation.

22.2 ENVIRONMENTAL COVENANTS

The Borrower covenants as follows:

(a) Compliance with Environmental Laws

The Borrower shall, and the Borrower shall cause all employees, agents, contractors, and tenants of the Borrower and any other persons present on or occupying the Real Property to, keep and maintain the Real Property in compliance with all Environmental Laws.

(b) Notices, Actions and Claims

The Borrower shall immediately advise the Lender in writing of (i) any notices from any governmental or quasi-governmental agency or authority of violation or potential violation of any Environmental Law received by the Borrower, (ii) any and all enforcement, cleanup, removal or other governmental or regulatory actions instituted, completed or threatened pursuant to any Environmental Law, (iii) all claims made or threatened by any third party against the Borrower or the Real Property relating to damage, contribution, cost recovery, compensation, loss or injury resulting from any Hazardous Substances, and (iv) discovery by the Borrower of any occurrence or condition on any real property adjoining or in the

vicinity of the Real Property that creates a foreseeable risk of contamination of the Real Property by or with Hazardous Substances.

22.3 THE LENDER'S RIGHT TO CONTROL CLAIMS

The Lender shall have the right (but not the obligation) to join and participate in, as a party if it so elects, any legal proceedings or actions initiated in connection with any Hazardous Substances and to have its related and reasonable attorneys' and consultants' fees paid by the Borrower upon demand.

22.4 INDEMNIFICATION

The Borrower shall be solely responsible for, and shall indemnify, defend, and hold harmless the Lender and its directors, officers, employees, agents, successors and assigns, from and against, any claim, judgment, loss, damage, demand, cost, expense or liability of whatever kind or nature, known or unknown, contingent or otherwise, directly or indirectly arising out of or attributable to the use, generation, storage, release, threatened release, discharge, disposal, or presence (whether prior to or after the date of this Trust Deed) of Hazardous Substances on, in, under or about the Real Property (whether by the Borrower, a predecessor in title, any tenant, or any employees, agents, contractor or subcontractors of any of the foregoing or any third persons at any time occupying or present on the Real Property), including: (i) personal injury; (ii) death; (iii) damage to property; (iv) all consequential damages; (v) the cost of any required or necessary repair, cleanup or detoxification of the Real Property, including the soil and ground water thereof, and the preparation and implementation of any closure, remedial or other required plans; (vi) damage to any natural resources; and (vii) all reasonable costs and expenses incurred by the Lender in connection with clauses (i) through (vi), including reasonable attorneys' and consultants' fees; provided, however, that nothing contained in this Section shall be deemed to preclude the Borrower from seeking indemnification from, or otherwise proceeding against, any third party including any tenant or predecessor in title to the Real Property, and further provided that this indemnification will not extend to matters caused by the Lender's gross negligence or willful misconduct, or arising from a release of Hazardous Substances which occurs after the Lender has taken possession of the Real Property, so long as the Borrower has not caused the release through any act or omission. The covenants, agreements, and indemnities set forth in this Section shall be binding upon the Borrower and its heirs, personal representatives, successors and assigns, and shall survive repayment of the Indebtedness, foreclosure of the Real Property, and the Borrower's granting of a deed to the Real Property in lieu of foreclosure. Payment shall not be a condition precedent to this indemnity. Said indemnities shall be limited to the actual damages incurred by the Lender, including all advances or payments paid or agreed to be paid by the Lender pursuant to its rights to require environmental assessments, join or participate in any proceedings, cure the Borrower's default or enforce its remedies, (a) prior to and after any judicial foreclosure of this Trust Deed or deed delivered and accepted in lieu thereof, or (b) prior to any nonjudicial foreclosure of this Trust Deed or deed delivered and accepted in lieu thereof. The obligations of the Borrower under this Section shall be mutually exclusive of any

liabilities arising after a nonjudicial foreclosure of this Trust Deed or the delivery and acceptance of a deed in lieu of such nonjudicial foreclosure, which are evidenced by the Environmental Indemnity Agreement. Any costs or expenses incurred by the Lender for which the Borrower is responsible or for which the Borrower has indemnified the Lender shall be paid to the Lender on demand, with interest at the Default Rate from the date incurred by the Lender until paid in full, and shall be secured by this Trust Deed. Without the prior written consent of the Lender, the Borrower shall not enter into any settlement agreement, consent decree, or other compromise in respect to any claims relating to Hazardous Substances. The Lender agrees that it shall not unreasonably delay its consideration of any written request for its consent to any such settlement agreement, consent decree, or other compromise once all information, reports, studies, audits, and other documentation have been submitted to the Lender.

22.5 ENVIRONMENTAL AUDITS

If a Default exists, or at any time the Lender has reason to believe that a release of Hazardous Substances may have occurred or may be likely to occur, the Lender may require that the Borrower retain, or the Lender may retain directly, at the sole cost and expense of the Borrower, a licensed geologist, industrial hygienist or an environmental consultant acceptable to the Lender to conduct an environmental assessment or audit of the Real Property. In the event that the Lender makes a reasonable determination of the need for an environmental assessment or audit, the Lender shall inform the Borrower in writing that such a determination has been made and, if requested to do so by the Borrower, give the Borrower a written explanation of that determination before the assessment or audit is conducted. The Borrower shall afford any person conducting an environmental assessment or audit access to the Real Property and all materials reasonably requested. The Borrower shall pay on demand the cost and expenses of any environmental consultant engaged by the Lender under this Subsection. The Borrower shall, at the Lender's request and at the Borrower's sole cost and expense, take such investigative and remedial measures determined by the geologist, hygienist or consultant to be necessary to address any condition discovered by the assessment or audit so that (i) the Real Property shall be in compliance with all Environmental Laws, (ii) the condition of the Real Property shall not constitute any identifiable risk to human health or to the environment, and (iii) the value of the Real Property shall not be affected by the presence of Hazardous Substances.

23. CONCERNING THE TRUSTEE

23.1 NO LIABILITY

If the Trustee or anyone acting by virtue of the Trustee's powers enters the Real Property, the Trustee will not be personally liable for debts contracted or for liability or damages incurred in the management or operation of the Real Property. The Trustee will have the right to rely on any instrument, document or signature authorizing or supporting any action taken or proposed to be taken by the Trustee or believed by the Trustee in good

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faith to be genuine. The Trustee will be entitled to reimbursement for expenses actually incurred by the Trustee in the performance of the Trustee's duties and to reasonable compensation for services rendered. The Borrower shall, from time to time, pay compensation due the Trustee under this Trust Deed and reimburse the Trustee for and save and hold the Trustee harmless from and against any and all loss, cost, liability, damage and expense whatsoever incurred by the Trustee in the performance of the Trustee's duties.

23.2 RETENTION OF MONEY

All money received by the Trustee must, until used or applied, be held in trust for the purposes for which it was received, but need not be segregated in any manner from any other money (except to the extent required by law) and the Trustee will have no liability for interest on any money received.

23.3 SUCCESSOR TRUSTEES

The Trustee may resign by giving notice of such resignation in writing to the Lender. If the Trustee's legal existence shall cease or if the Trustee resigns or becomes disqualified from acting in the execution of this Trust or fails or refuses to exercise the same when requested by the Lender so to do or if for any reason and without cause the Lender prefers to appoint a substitute trustee to act instead of the original Trustee, or any prior successor or substitute trustee, the Lender will have full power to appoint a substitute trustee and, if preferred, several substitute trustees in succession who shall succeed to all the estates, rights, powers and duties of the Trustee.

23.4 SUCCESSION INSTRUMENTS

Any new Trustee appointed will, without any further act, deed or conveyance, become vested with all the estates, properties, rights, powers and trusts of the Trustee's predecessor. Upon the written request of the Lender or of any successor trustee, the former Trustee shall execute and deliver an instrument transferring to such successor Trustee all the estates, properties, rights, powers and trusts of the former Trustee, and shall duly assign, transfer and deliver any of the property and money held by the former Trustee to the successor Trustee so appointed in the former Trustee's place.

23.5 PERFORMANCE OF DUTIES BY AGENTS

The Trustee may authorize one or more parties to act on the Trustee's behalf to perform the Trustee's ministerial functions, including, without limitation, the transmittal and posting of any notices.

24. SECONDARY MARKET

24.1 DISSEMINATION OF INFORMATION

In connection with any transfer of the Loan, the Lender may forward any documents and information that the Lender now has or acquires in the future concerning the Loan, including the financial statements of any Obligor, and such other information as may be reasonably related to the Obligors, the Property or the Leases to any:

- (i) transferee or prospective transferee of the Loan;
- (ii) Rating Agency rating the Loan, a Participation, or Securities; or
- (iii) purchaser, transferee, assignee, servicer, participant, investor or prospective investor in any Securitization, or to any of their advisors.

The Borrower irrevocably waives any and all rights it may have under applicable Legal Requirements to prohibit such disclosure, including any right of privacy.

24.2 COOPERATION

The Borrower and any Guarantor agree to cooperate with the Lender in connection with any transfer of the Loan or any Participation or Securities. The Borrower agrees to provide to the Lender or to any persons to whom the Lender may disseminate such information, at the Lender's request, financial statements of Obligors, an estoppel certificate and such other documents as may be reasonably related to the Obligors, the Property, or the Leases.

24.3 ADDITIONAL FINANCIAL INFORMATION

If a decision is made to include the Loan in a Securitization and the amount of the Loan would exceed twenty percent (20%) of the amount estimated in good faith to be raised in the offering, the Borrower agrees to provide, to the extent required by SEC Regulation S-X Rule 3-14, and to the extent not previously supplied to Lender, financial statements for the Real Property in respect of the three years prior to the Securitization. If the amount of the Loan would exceed ten percent (10%) (but not twenty percent (20%)) of the amount estimated in good faith to be raised by the offering, the Borrower agrees to provide such additional property-related financial information as the Lender may request in order to meet then-applicable SEC rules in connection with the contemplated manner of the offering.

24.4 RESERVES/ESCROWS

If Participations are granted or Securities issued in connection with the Loan, all funds held by the Lender in escrow or as reserves in accordance with the Loan Documents may, at the Lender's discretion, be deposited in "eligible accounts" at "eligible institutions" and invested in "permitted investments" as then defined and required by the Rating Agencies.

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25. MISCELLANEOUS

25.1 SUCCESSORS AND ASSIGNS

All of the terms of the Loan Documents shall apply to, be binding upon and inure to the benefit of the heirs, personal representatives, successors and assigns of the Obligors, or to the holder of the Note, as the case may be.

25.2 SURVIVAL OF OBLIGATIONS

Each and all of the Obligations shall continue in full force and effect until the latest of (a) the date the Indebtedness has been paid in full and the Obligations have been performed and satisfied in full, (b) the last date permitted by law for bringing any claim or action with respect to which the Lender may seek payment or indemnification in connection with the Loan Documents, and (c) the date on which any claim or action for which the Lender seeks payment or indemnification is fully and finally resolved and, if applicable, any compromise thereof of judgment or award thereon is paid in full.

25.3 FURTHER ASSURANCES

The Borrower, upon the request of the Lender, shall complete, execute, acknowledge, deliver and record or file such further instruments and do such further acts as may be necessary to carry out more effectively the purposes of this Trust Deed, to subject any property intended to be covered by this Trust Deed to the liens and security interests it creates, to place third parties on notice of those liens and security interests, or to correct any defects which may be found in any Loan Document.

25.4 RIGHT OF INSPECTION

The Lender shall have the right from time to time, upon reasonable advance notice to the Borrower, to enter onto the Real Property for the purpose of inspecting and reporting on its physical condition, tenancy and operations.

25.5 EXPENSE INDEMNIFICATION

The Borrower shall pay all filing and recording fees, documentary stamps, intangible taxes, and all expenses incident to the execution and acknowledgment of this Trust Deed, the Note or any of the other Loan Documents, any supplements, amendments, renewals or extensions of any of them, or any instrument entered into under Subsection 25.3. The Borrower shall pay or reimburse the Lender, upon demand, for all costs and expenses, including appraisal and reappraisal costs of the Property and reasonable attorneys' and legal assistants' fees, which the Lender may incur in connection with enforcement proceedings under the Note, this Trust Deed, or any of the other Loan Documents (including all fees and costs incurred in enforcing or protecting the Note, this Trust Deed, or any of the other Loan Documents in any bankruptcy proceeding), and attorneys' and legal assistants' fees incurred by the Lender in any other suit, action, legal proceeding or dispute of any kind in which the Lender is made a party or appears as party plaintiff or defendant, affecting the Indebtedness, the Note, this Trust Deed, any of the other Loan

Documents, or the Property, or required to protect or sustain the lien of this Trust Deed. The Borrower shall be obligated to pay (or to reimburse the Lender) for such fees, costs and expenses and shall indemnify and hold the Lender harmless from and against any and all loss, cost, expense, liability, damage and claims and causes of action, including attorneys' fees, incurred or accruing by reason of the Borrower's failure to promptly repay any such fees, costs and expenses. If any suit or action is brought to enforce or interpret any of the terms of this Trust Deed (including any effort to modify or vacate any automatic stay or injunction, any trial, any appeal, any petition for review or any bankruptcy proceeding), the prevailing party shall be entitled to recover all expenses reasonably incurred in preparation for or during the suit or action or in connection with any appeal of the related decision, whether or not taxable as costs. Such expenses include reasonable attorneys' fees, witness fees (expert or otherwise), deposition costs, copying charges and other expenses. Whether or not any court action is involved, all reasonable expenses, including the costs of searching records, obtaining title reports, appraisals, environmental assessments, surveying costs, title insurance premiums, trustee fees, and other reasonable attorneys' fees, incurred by the Lender that are necessary at any time in the Lender's opinion for the protection of its interest or enforcement of its rights shall become a part of the Indebtedness payable on demand and shall bear interest from the date of expenditure until repaid at the interest rate as provided in the Note. The Borrower shall also pay all such costs and fees, including those of the Lender's attorneys, witnesses and appraisers, that are incurred after a trustee's sale or foreclosure in connection with an action for a deficiency judgment against Borrower or any Guarantor and the same shall not be secured by this Trust Deed.

25.6 GENERAL INDEMNIFICATION

The Borrower shall indemnify, defend and hold the Lender harmless against: (i) any and all claims for brokerage, leasing, finder's or similar fees which may be made relating to the Real Property or the Indebtedness, and (ii) any and all liability, obligations, losses, damages, penalties, claims, actions, suits costs and expenses (including the Lender's reasonable attorneys' fees, together with reasonable appellate counsel fees, if any) of whatever kind or nature which may be asserted against, imposed on or incurred by the Lender in connection with the Indebtedness, this Trust Deed, the Real Property or any part thereof, or the operation, maintenance and/or use thereof, or the exercise by the Lender of any rights or remedies granted to it under this Trust Deed or pursuant to applicable law; provided, however, that nothing herein shall be construed to obligate the Borrower to indemnify, defend and hold harmless the Lender from and against any of the foregoing which is imposed on or incurred by the Lender by reason of the Lender's willful misconduct or gross negligence.

25.7 RECORDING AND FILING

The Borrower shall cause this Trust Deed and all amendments, supplements, and substitutions to be recorded, filed, re-recorded and re-filed in such manner and in such places as the Lender may reasonably request. The Borrower will pay all recording filing, re-recording and re-filing taxes, fees and other charges.

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25.8 NO WAIVER

No deliberate or unintentional failure by the Lender to require strict performance by the Borrower of any Obligation shall be deemed a waiver, and the Lender shall have the right at any time to require strict performance by the Borrower of any Obligation.

25.9 COVENANTS RUNNING WITH THE LAND

All Obligations are intended by the parties to be and shall be construed as covenants running with the Land.

25.10 SEVERABILITY

The Loan Documents are intended to be performed in accordance with, and only to the extent permitted by, all applicable Legal Requirements. Any provision of the Loan Documents that is prohibited or unenforceable in any jurisdiction shall nevertheless be construed and given effect to the extent possible. The invalidity or unenforceability of any provision in a particular jurisdiction shall neither invalidate nor render unenforceable any other provision of the Loan Documents in that jurisdiction, and shall not affect the validity or enforceability of that provision in any other jurisdiction. If a provision is held to be invalid or unenforceable as to a particular person or under a particular circumstance, it shall nevertheless be presumed valid and enforceable as to others, or under other circumstances.

25.11 USURY

The parties intend that no provision of the Note or the Loan Documents be interpreted, construed, applied, or enforced so as to permit or require the payment or collection of interest in excess of the Maximum Permitted Rate. In this regard, the Borrower and the Lender each stipulate and agree that it is their common and overriding intent to contract in strict compliance with applicable usury laws. Accordingly, none of the terms of this Trust Deed, the Note or any of the other Loan Documents shall ever be construed to create a contract to pay, as consideration for the use, forbearance or detention of money, interest at a rate in excess of the Maximum Permitted Rate, and the Borrower shall never be liable for interest in excess of the Maximum Permitted Rate. Therefore, (a) in the event that the Indebtedness and Obligations are prepaid or the maturity of the Indebtedness and Obligations is accelerated by reason of an election by the Lender, unearned interest shall be canceled and, if theretofore paid, shall either be refunded to the Borrower or credited on the Indebtedness, as the Lender may elect; (b) the aggregate of all interest and other charges constituting interest under applicable laws and contracted for, chargeable or receivable under the Note and the other Loan Documents or otherwise in connection with the transaction contemplated thereby shall never exceed the maximum amount of interest, nor produce a rate in excess of the Maximum Permitted Rate; and (c) if any excess interest is provided for or received, it shall be deemed a mistake, and the same shall, at the option of the Lender, either be refunded to the Borrower or credited on the unpaid principal amount (if any), and the Indebtedness shall be automatically reformed so as to permit only the collection of the interest at the Maximum Permitted

Rate. Furthermore, if any provision of the Note or any of the other Loan Documents is interpreted, construed, applied, or enforced, in such a manner as to provide for interest in excess of the Maximum Permitted Rate, then the parties intend that such provision automatically shall be deemed reformed retroactively so as to require payment only of interest at the Maximum Permitted Rate. If, for any reason whatsoever, interest paid or received during the full term of the applicable Indebtedness produces a rate which exceeds the Maximum Permitted Rate, then the amount of such excess shall be deemed credited retroactively in reduction of the then outstanding principal amount of the Indebtedness, together with interest at such Maximum Permitted Rate. The Lender shall credit against the principal of such Indebtedness (or, if such Indebtedness shall have been paid in full, shall refund to the payor of such interest) such portion of said interest as shall be necessary to cause the interest paid to produce a rate equal to the Maximum Permitted Rate. All sums paid or agreed to be paid to the Lender for the use, forbearance or detention of money shall, to the extent permitted by applicable law, be amortized, prorated, allocated and spread in equal parts throughout the full term of the applicable Indebtedness, so that the interest rate is uniform throughout the full term of such Indebtedness. In connection with all calculations to determine the Maximum Permitted Rate, the parties intend that all charges be excluded to the extent they are properly excludable under applicable usury laws, as they from time to time are determined to apply to this transaction. The provisions of this Section shall control all agreements, whether now or hereafter existing and whether written or oral, between the Borrower and the Lender.

25.12 ENTIRE AGREEMENT

The Loan Documents contain the entire agreements between the parties relating to the financing of the Real Property, and all prior agreements which are not contained in the Loan Documents, other than the unsecured Environmental Indemnity Agreement, are terminated. The Loan Documents represent the final agreement between the parties and may not be contradicted by evidence of prior, contemporancous, or subsequent oral agreements of the parties. There are no unwritten oral agreements between the parties. The Loan Documents may be amended, revised, waived, discharged, released or terminated only by a written instrument or instruments executed by the party against whom enforcement of the amendment, revision, waiver, discharge, release or termination is asserted. Any alleged amendment, revision, waiver, discharge, release or termination that is not so documented shall be null and void.

25.13 NOTICES

In order for any demand, consent, approval or other communication to be effective under the terms of this Trust Deed, "Notice" must be provided under the terms of this Subsection. All Notices must be in writing. Notices may be (a) delivered by hand, (b) transmitted by facsimile (with a duplicate copy sent by first class mail, postage prepaid), (c) sent by certified or registered mail, postage prepaid, return receipt requested, or (d) sent by reputable overnight courier service, delivery charges prepaid. Notices shall be addressed as set forth below:

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If to the Lender:

Transamerica Life Insurance Company c/o AEGON USA Realty Advisors, Inc. 4333 Edgewood Road, N.E. Cedar Rapids, Iowa 52499-5443 Attn: Mortgage Loan Department

Reference: Loan #89577 Fax Number: (319) 369-2277

If to the Borrower:

Advanced American Construction Properties, LLC 8444 NW St. Helens Road Portland, Oregon 97231 Attn: Marvin D. Burch Fax Number: (503) 650-8230

If to the Trustee:

Fidelity National Title Insurance Company 900 SW Fifth Avenue Portland, Oregon 97204 Fax Number: 503-796-6625

Notices delivered by hand or by overnight courier shall be deemed given when actually received or when refused by their intended recipient. Notices sent by facsimile will be deemed delivered when a legible copy has been received (provided receipt has been verified by telephone confirmation or one of the other permitted means of giving Notices under this Subsection). Mailed Notices shall be deemed given on the date of the first attempted delivery (whether or not actually received). Either the Lender or the Borrower may change its address for Notice by giving at least fifteen (15) Business Days' prior Notice of such change to the other party.

25.14 COUNTERPARTS

This Trust Deed may be executed in any number of counterparts, each of which shall be an original, but all of which together shall constitute but one instrument.

25.15 CHOICE OF LAW

This Trust Deed shall be interpreted, construed, applied, and enforced according to, and will be governed by, the laws of Oregon, without regard to any choice of law principle which, but for this provision, would require the application of the law of another jurisdiction and regardless of where executed or delivered, where payable or paid, where any cause of action accrues in connection with this transaction, where any action or other

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AAC Headquarter Building, Portland, Oregon AEGON Loan No. 89577 Seattle-3289047.2 0027988-00443 proceeding involving the Loan is instituted, or whether the laws of Oregon otherwise would apply the laws of another jurisdiction.

25.16 FORUM SELECTION

The Borrower agrees that the sole and exclusive forum for the determination of any action relating to the validity and enforceability of the Note, this Trust Deed and the other Loan Documents, and any other instruments securing the Note shall be either in an appropriate court of the State of Oregon or the applicable United States District Court.

25.17 SOLE BENEFIT

This Trust Deed and the other Loan Documents have been executed for the sole benefit of the Borrower, the Guarantor and the Lender and the successors and assigns of the Lender. No other party shall have rights thereunder or be entitled to assume that the parties thereto will insist upon strict performance of their mutual obligations hereunder, any of which may be waived from time to time. Neither the Borrower nor any Guarantor shall have any right to assign any of its rights under the Loan Documents to any party whatsoever.

25.18 RELEASE OF CLAIMS

The Borrower hereby RELEASES, DISCHARGES and ACQUITS forever the Lender and its officers, directors, trustees, agents, employees and counsel (in each case, past, present or future) from any and all Claims existing as of the date hereof (or the date of actual execution hereof by the Borrower, if later). As used herein, the term "Claim" shall mean any and all liabilities, claims, defenses, demands, actions, causes of action, judgments, deficiencies, interest, liens, costs or expenses (including court costs, penalties, attorneys' fees and disbursements, and amounts paid in settlement) of any kind and character whatsoever, including claims for usury, breach of contract, breach of commitment, negligent misrepresentation or failure to act in good faith, in each case whether now known or unknown, suspected or unsuspected, asserted or unasserted or primary or contingent, and whether arising out of written documents, unwritten undertakings, course of conduct, tort, violations of laws or regulations or otherwise.

25.19 NO PARTNERSHIP

Nothing contained in the Loan Documents is intended to create any partnership, joint venture or association between the Borrower and the Lender, or in any way make the Lender a co-principal with the Borrower with reference to the Property.

25.20 PAYOFF PROCEDURES

If the Borrower pays or causes to be paid to the Lender all of the Indebtedness, then upon receipt by the Lender of such payment, the Lender shall either (a) release this Trust Deed, or (b) assign the Loan Documents and endorse the Note (in either case without recourse or warranty of any kind) to a takeout lender, upon payment (in the latter case) of an administrative fee of Seven Hundred Fifty Dollars (\$750).

25.21 SURVIVAL OF COMMITMENT TERMS

The Commitment shall survive the execution of this Trust Deed and the other Loan Documents. Any term of the Commitment that has been inadvertently omitted from the Loan Documents is hereby incorporated in this Trust Deed by reference. If any term of the Commitment conflicts with a provision of this Trust Deed that addresses the same subject, the terms of this Trust Deed shall prevail. Any provision of the Commitment which specifically states that it shall survive the closing of the Loan shall so survive, and is hereby incorporated in this Trust Deed by reference.

25.22 FUTURE ADVANCES

Under this Trust Deed, "Indebtedness" is defined to include certain advances made by the Lender in the future. Such advances include any additional disbursements to the Borrower (unless in connection with another, independent mortgage financing) and any obligations under agreements which specifically provide that such obligations are secured by this Trust Deed. In addition, Indebtedness is defined to include any amounts advanced to pay Impositions, to cure Defaults, or to pay the costs of collection and receivership. Accordingly, all such advances and obligations shall be equally secured with, and shall have the same priority as, the Indebtedness, and shall be subject to all of the terms and provisions of this Trust Deed. The Borrower shall pay any taxes that may be due in connection with any such future advance.

25.23 INTERPRETATION

(a) Headings and General Application

The section, subsection, paragraph and subparagraph headings of this Trust Deed are provided for convenience of reference only and shall in no way affect, modify or define, or be used in construing, the text of the sections, subsections, paragraphs or subparagraphs. If the text requires, words used in the singular shall be read as including the plural, and pronouns of any gender shall include all genders.

(b) Sole Discretion

The Lender may take any action or decide any matter under the terms of this Trust Deed or of any other Loan Document (including any consent, approval, acceptance, option, election or authorization) in its sole and absolute discretion, for any reason or for no reason, unless the related Loan Document contains specific language to the contrary. Any approval or consent that the Lender might withhold may be conditioned in any way.

(c) Result of Negotiations

This Trust Deed results from negotiations between the Borrower and the Lender and from their mutual efforts. Therefore, it shall be so construed, and not as though it had been prepared solely by the Lender.

(d) Reference to Particulars

The scope of a general statement made in this Trust Deed or in any other Loan Document shall not be construed as having been reduced through the inclusion of references to particular items that would be included within the statement's scope. Therefore, unless the relevant provision of a Loan Document contains specific language to the contrary, the term "include" shall mean "include, but shall not be limited to" and the term "including" shall mean "including, without limitation."

25.24 JOINT AND SEVERAL LIABILITY

If there is more than one individual or entity executing this Trust Deed as the Borrower, liability of such individuals and entities under this Trust Deed shall be joint and several.

25.25 TIME OF ESSENCE

Time is of the essence of each and every covenant, condition and provision of this Trust Deed to be performed by the Borrower.

25.26 JURY WAIVER

THE BORROWER AND BY ITS ACCEPTANCE HEREOF, THE LENDER, HEREBY WAIVE ANY RIGHT TO A TRIAL BY JURY IN ANY ACTION OR PROCEEDING TO ENFORCE OR DEFEND ANY RIGHTS (I) UNDER THIS TRUST DEED OR ANY OTHER LOAN DOCUMENT, OR (II) ARISING FROM ANY LENDING RELATIONSHIP EXISTING IN CONNECTION WITH THIS TRUST DEED OR ANY OTHER LOAN DOCUMENT, AND THE BORROWER AND BY ITS ACCEPTANCE HEREOF, THE LENDER, AGREE THAT ANY SUCH ACTION OR PROCEEDING SHALL BE TRIED BEFORE A JUDGE AND NOT BEFORE A JURY.

25.27 RENEWAL, EXTENSION, MODIFICATION AND WAIVER

The Lender, at its option, may at any time renew or extend this Trust Deed, the Note or any other Loan Document. The Lender may enter into a modification of any Loan Document or of the Environmental Indemnity Agreement without the consent of any person not a party to the document being modified. The Lender may waive any covenant or condition of any Loan Document or of the Environmental Indemnity Agreement, in whole or in part, at the request of any person then having an interest in the Property or in any way liable for any part of the Indebtedness. The Lender may take, release, or resort to any security for the Note and the Obligations and may release any party primarily or secondarily liable on any Loan Document or on the Environmental Indemnity Agreement, all without affecting any liability not expressly released in writing by the Lender.

25.28 CUMULATIVE REMEDIES

Every right and remedy provided in this Trust Deed shall be cumulative of every other right or remedy of the Lender, whether conferred by law or by grant or contract, and may be enforced concurrently with any such right or remedy. The acceptance of the performance of any obligation to cure any Default shall not be construed as a waiver of any rights with respect to any other past, present or future Default. No waiver in a particular instance of the requirement that any Obligation be performed shall be construed as a waiver with respect to any other Obligation or instance.

25.29 NO OBLIGATION TO MARSHAL ASSETS

No holder of any trust deed, security interest or other encumbrance affecting all or any portion of the Real Property, which encumbrance is inferior to the title and security interest of this Trust Deed, shall have any right to require the Lender to marshal assets.

25.30 TRANSFER OF OWNERSHIP

The Lender may, without notice to the Borrower, deal with any person in whom ownership of any part of the Real Property has vested, without in any way vitiating or discharging the Borrower from liability for any of the Obligations.

25.31 ACKNOWLEDGMENT OF RECEIPT OF TRUST DEED

TRUSTOR HEREBY DECLARES AND ACKNOWLEDGES THAT TRUSTOR HAS RECEIVED, WITHOUT CHARGE, A TRUE COPY OF THIS TRUST DEED.

UNDER OREGON LAW, MOST AGREEMENTS, PROMISES AND COMMITMENTS MADE BY BENEFICIARY AFTER OCTOBER 3, 1989, CONCERNING LOANS AND OTHER CREDIT EXTENSIONS WHICH ARE NOT FOR PERSONAL, FAMILY OR HOUSEHOLD PURPOSES OR SECURED SOLELY BY THE TRUSTOR'S RESIDENCE MUST BE IN WRITING, EXPRESS CONSIDERATION AND BE SIGNED BY THE BENEFICIARY TO BE ENFORCEABLE.

(Signature follows on next page)

IN WITNESS WHEREOF, the Borrower has caused this Trust Deed to be duly executed as of the date first above written.

BORROWER:

ADVANCED AMERICAN CONSTRUCTION PROPERTIES, LLC, an Oregon limited liability company

By:

Marvin D. Burch
Its Authorized Member

STATE OF OREGON

) ss.

COUNTY OF Multrand

This instrument was acknowledged before me on four plants and provided provi

EXHIBIT A

Legal Description:

PARCEL 1:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning on the north line of Block C, Springville, now vacated, with the intersection of the northeasterly line of the Spokane, Portland & Seattle Railway right-of-way; thence North 52 East 292.9 feet; thence North 38 46' West 70 feet; thence South 52 West 300.7 feet; thence South 45 06' East 70.53 feet to the place of beginning.

PARCEL 2:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at the southeasterly corner of the tract of land conveyed to Portland Manufacturing Company by deed recorded April 8, 1936 in Book 332, Page 556, Deed Records, said point also being on the northerly line of the tract of land conveyed to L.A. Jacobsen by deed recorded May 24, 1921 in Book 853, Page 8, Deed Records; thence South 52 West along the northerly line of said Jacobsen tract 289 feet to the northeasterly line of the Northern Pacific Railroad right-of-way also referred to as the Spokane, Portland & Seattle Railway right-of-way; thence Northwesterly along said northeasterly right-of-way line to its intersection with the easterly extension of the southeasterly line of Ferry Street, said point also being the southwest corner of the tract of land conveyed to Multnomah County by deed recorded July 12, 1912 in Book 586, Page 347, Deed Records; thence North 52 East 292.9 feet to the low water mark of the Willamette River; thence Southeasterly along said low water mark to the place of beginning.

PARCEL 3:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at a point on the northeasterly line of the Spokane, Portland & Seattle Railway right-of-way which is North 38 West 3.94 feet from the southeasterly line of Lot 2, Block 3, on the plat of Springville, recorded in Book G, Page 255, Deed Records; thence Northwesterly along said northeasterly right-of-way line 751.17 feet to a point which is North 38 West 753.94 feet from the southeast corner of aforesaid Lot 2; thence North 52 East parallel with the southeasterly line of said Lot 2, a distance of 289 feet to the harbor line of the Willamette River;

thence South 48 13' 44" East along said harbor line 762.10 feet to a point which is North 52 East from the point of beginning; thence South 52 West 401.77 feet to the place of beginning.

EXCEPT that portion lying below the low water line of the Willamette River.

FURTHER EXCEPTING the tract of land conveyed to Multnomah County by deed recorded September 16, 1929 in Book 29, Page 28, Deed Records, described as follows:

Beginning at a point on the harbor line of the Willamette River which is 80 feet Northerly from, when measured at right angles to the centerline of N. Philadelphia Avenue, extended Westerly, said point also being 204 feet Southerly from the northeast corner of Parcel 3 as above described; thence Westerly parallel with the extended centerline of said street 100 feet; thence Southerly at right angles 30 feet; thence Westerly parallel with the extended centerline of said street, 205 feet to a point on the northeasterly right-of-way line of the Spokane, Portland and Seattle Railway which is 50 feet Northerly from, when measured at right angles to, said extended street centerline; thence Southerly along said right-of-way line to a point which is 50 feet Southerly from, when measured at right angles to, said extended street centerline; thence Easterly parallel with the westerly extension of the centerline of N. Philadelphia Avenue 194 feet; thence Southerly at right angles 30 feet; thence Easterly, parallel with said extended street centerline 140 feet to a point on the harbor line which is 80 feet Southerly from, when measured at right angles to, said extended street centerline; thence Northerly along said harbor line 164.9 feet to the place of beginning.

PARCEL 4:

A tract of land in the Southeast 1/4 of Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at a 5/8" iron rod w/yellow plastic cap (YPC) "Caswell PLS 737" shown as a set monument on Multnomah County Survey #50640, which bears South 34 degrees 08'07" East, 2337.09 feet from the Witness Corner of the S.E. Corner of the G.J. Watts DLC #46, said rod located at the intersection of the Southerly right-of-way line (ROW) of the St. Helens Bridge and the Southwesterly ROW of the Northern Pacific R.R. railroad; thence Southeasterly 272.28 feet along aforementioned railroad ROW on the arc of a 3706.79 foot radius curve to the right (the chord of which bears S37 degrees 15'40" E, 272.22 feet) to a 5/8" iron rod w/YPC "City of Portland Water Bureau"; thence S54 degrees 46'42"W, 82.72 feet to a 5/8" iron rod w/YPC "City of Portland Water Bureau" on the Northeasterly ROW line of Columbia River Highway (Hwy 30); thence N35 degrees 33'46" W, 275.72 feet along the aforementioned Northeasterly ROW line of Columbia River Highway (Hwy 30) to its intersection with the Southerly ROW line of the St. John's Bridge to a 5/8" iron rod shown as a set monument on Multnomah County Survey #50640; thence N57 degrees 35'18" E, 74.76 feet along the Southerly ROW of the St. Johns

Bridge to its intersection with aforementioned Northern Pacific R.R. ROW line to the point of beginning.

PARCEL 5:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at the intersection of the northwesterly line and its southwesterly extension of Lots 3 and 8, Block 1, Springville, now vacated, said line also being the northerly line of Tax Lot 10 as shown by the 1940 Tax Roll, with the northeasterly line of NW St. Helens Road (as existed in 1952); thence Southeasterly along said northeasterly road line 26.6 feet to the northwest corner of the tract of land conveyed to Multnomah County by deed recorded September 27, 1929 in Book 31, Page 288, Deed Records; thence North 55 48' East along the northwesterly line of said tract 128 feet, more or less, to the southwesterly line of the Spokane, Portland and Seattle Railway right-of-way; thence Northwesterly along said southwesterly right-of-way line to the northwesterly line of aforesaid Lot 3, Block 1, Springville; thence Southwesterly along said northwesterly line and its southwesterly extension of Lots 3 and 8, Block 1, Springville, now vacated, to the place of beginning.

EXCEPTING THEREFROM that portion acquired by the State of Oregon by and through its State Highway Commission, Circuit Court Case No. 282435, Multnomah County, Oregon.

PARCEL 6:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at the intersection of the southeasterly line of Lot 2, Block 1, Springville, now vacated, with the southwesterly line of the Spokane, Portland and Seattle Railway right-of-way; thence Northwesterly along said right-of-way line to the northwesterly line of Block C, Springville, now vacated; thence Southwesterly along said northwesterly block line and its southwesterly extension to the northeasterly line of NW St. Helens Road (as existed in 1952); thence Southeasterly along said northeasterly road line to its intersection with the southwesterly extension of the southeasterly line of Lot 9, Block 1, Springville, now vacated; thence Northeasterly to the point of beginning; TOGETHER WITH the right to use the roadway under the West end of the St. Johns Bridge.

EXCEPTING THEREFROM that portion acquired by the State of Oregon by and through its State Highway Commission, Circuit Court Case No. 282435, Multnomah County, Oregon.

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Prepared by, and after recording return to: David H. Rockwell, Esq. Stoel Rives LLP 600 University Street Suite 3600 Seattle, Washington 98101-4109

Recorded in MULTNOMAH COUNTY, OREGON
C. Swick, Deputy Clerk
C52 17
Total: 106.00

2006-073514 04/24/2006 10:38:49am

Loan No. 89577

SPACE ABOVE THIS LINE FOR RECORDER'S USE

Absolute Assignment of Leases and Rents

(Multnomah County, Oregon)

This Absolute Assignment of Leases and Rents (this "Assignment") is made as of this 24 day of April, 2006, by ADVANCED AMERICAN CONSTRUCTION PROPERTIES, LLC, an Oregon limited liability company, whose address is 8444 NW St. Helens Road, Portland, Oregon 97231 (the "Borrower"), in favor of TRANSAMERICA LIFE INSURANCE COMPANY, an Iowa corporation, whose address is c/o AEGON USA Realty Advisors, Inc., 4333 Edgewood Road, N.E., Cedar Rapids, Linn County, Iowa 52499-5443 (the "Lender"). The definitions of capitalized terms used in this Assignment and not defined above or in the recitals of Section 1 may be found in Section 2 below.

1. **RECITALS**

- A. The Lender has advanced funds (the "Loan") to the Borrower, evidenced by the Secured Promissory Note of the Borrower, dated as of even date herewith and payable to the order of the Lender, in the principal amount of Four Million Five Hundred Thousand Dollars (\$4,500,000) (together with any extensions, renewals, amendments, or modifications, the "Note"), secured in part by that certain Line of Credit Trust Deed, Security Agreement and Fixture Filing, dated of even date herewith and filed for record in the official records of Multnomah County, Oregon (together with any extensions, supplements, modifications, amendments, and consolidations thereof, collectively referred to herein as the "Trust Deed"), and encumbering that certain land situated in Multnomah County, Oregon, described on Exhibit A attached hereto and incorporated herein (the "Land") and the Improvements (as defined below) located on the Land. The Land and the Improvements, collectively, are the "Real Property."
- B. The Lender has required the Borrower, as a condition to the Lender making the Loan, to make the assignments and grant the rights set forth in this Assignment.
- C. The Lender desires to grant the Borrower a conditional license to collect and use the income derived from the Real Property and to take certain leasing actions in the ordinary course of business.

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AAC Headquarter Building, Portland, Oregon AEGON Loan No. 89577 Seattle-3289153.2 0027988-00443



2. **DEFINITIONS**

- "AACI Lease" means the lease to the Tenant dated April 14, 2006.
- "Borrower Affiliate" means an entity that is controlled by, or is under common control with, the Borrower.
- "Business Day" means any day when state and federal banks are open for business in Cedar Rapids, Iowa.
- "Default" shall have the definition set forth in the Trust Deed.
- "Fixtures" shall have the definition set forth in the Trust Deed.
- "Improvements" shall have the definition set forth in the Trust Deed.
- "Leases" means all of the Borrower's right, title and interest, now or in the future, under the AACI Lease, together with all other leases or other agreements, written or oral, conferring any tenancy or right to occupy, possess or use any portion of the Real Property (together with all extensions, renewals and modifications of Leases), all guaranties of or letters of credit securing the tenants' performance of obligations under Leases, the Borrower's interest in any further leases, subleases, lettings or agreements (including subleases and tenancies following attornment) upon or covering use or occupancy of all or any part of the Real Property, and all other agreements conferring any right to collect Rents, including the Borrower's rights to cancel, modify, terminate, or accept the surrender of the Leases, to remove and evict the tenants under any Lease, or to increase or reduce Rents.
- "<u>Leasing Actions</u>" means all executions, modifications, terminations, and extensions of Leases, all grants of purchase options or rights of first refusal, and all other actions taken by the Borrower in exercising its rights as landlord under the Leases.
- "Loan Documents" means all documents entered into in connection with the making and acceptance of the Loan, with the exception of the Environmental Indemnity Agreement entered into as of even date herewith in support of the Loan.
- "Major Tenant Bankruptcy Event" means the bankruptcy, threatened bankruptcy, or insolvency (as reasonably determined by the Lender) of the Tenant, or Lender's reasonable belief that the Tenant is insolvent.
- "Material Lease LOC" means any letter of credit of which the Borrower is the beneficiary supporting the obligations of the related tenant under a Lease, if the amount of the letter of credit exceeds Two Hundred Fifty Thousand Dollars (\$250,000).
- "New Owner" means (a) the purchaser at a foreclosure or trustee's sale of the Real Property, whether the purchaser is the Lender or a third party, or (b) the grantee of a deed given in lieu of foreclosure.
- "Notice" means a notice delivered in accordance with Section 20.
- "Obligations" means all of the obligations required to be performed under the terms and conditions of any of the Loan Documents by the Borrower or by any other person, except for obligations that are expressly stated to be unsecured under the terms of another Loan Document.
- "Rents" means all rents, income, receipts, royalties, issues and profits and other benefits paid or payable for using, leasing, licensing, possessing, operating from or in, residing in, selling, mining, extracting minerals from, or otherwise enjoying the Real Property,

whether presently existing or arising in the future, to which the Borrower may now or hereafter become entitled or may demand or claim, including security deposits, amounts drawn under letters of credit securing tenant obligations, minimum rents, additional rents, parking revenues, deficiency rents, termination payments, space contraction payments, damages following default under a Lease, premiums payable by tenants upon their exercise of cancellation privileges, proceeds from lease guarantees, proceeds payable under any policy of insurance covering loss of rents resulting from untenantability caused by destruction or damage to the Real Property, all rights and claims of any kind which the Borrower has or may in the future have against the tenants under the Leases, lease guarantors, or any subtenants and other occupants of the Real Property; all proceeds of any sale of the Real Property in violation of the Loan Documents, any future award granted the Borrower in any court proceeding involving any tenant in any bankruptcy, insolvency, or reorganization proceedings in any state or federal court; and any and all payments made by any tenant in lieu of rent.

"Revocation Event" means a Default or a Major Tenant Bankruptcy Event.

"Tenant" means Advanced American Construction, Inc., an Oregon corporation.

3. ASSIGNMENT

For value received, and as an inducement to the Lender to advance the proceeds of the Loan to or for the benefit of the Borrower, the Borrower does hereby grant, bargain, sell, transfer, set over, deliver, and absolutely, unconditionally and irrevocably assign unto the Lender the Leases and the Rents, to have and to hold the same unto the Lender and unto its successors and assigns, forever.

This Assignment is made in support of the Loan and in support of the payment, observance, performance and discharge of all obligations, conditions, covenants, and warranties contained in the Trust Deed and the other Loan Documents. This Assignment is and shall be primary and on parity with the lien on the real estate conveyed by the Trust Deed.

The Lender and the Borrower intend for this Assignment to be a present and absolute assignment of the Leases and the Rents. However, if future legislation shall provide, or a court of competent jurisdiction shall decree, that an assignment of leases and rents made in support of a commercial mortgage loan such as the Loan may not be absolute, then this Assignment shall be deemed amended retroactively to the minimum extent necessary to achieve compliance with applicable legal requirements.

4. LICENSE TO COLLECT AND USE THE RENTS

The Lender grants to the Borrower a conditional license, subject to the Lender's rights under Section 10 and Section 11 below, to collect the Rents, other than those Rents paid more than one (1) month in advance. The Borrower may use the Rents so collected for any lawful purpose which is consistent with the Borrower's ongoing performance of its obligations under the Loan Documents, provided (a) no Default then exists, and (b) the Borrower does not intend to cause, and has no reason to expect the occurrence of, any Default in respect of the Obligations due to be performed in the following calendar month.

Any Rents excluded from the scope of this license shall be trust funds for the benefit of the Lender. The Lender may require that such Rents be deposited in a reserve fund to

serve as additional security for the Loan, or to be used to benefit the Real Property, under such terms and conditions as the Lender may determine in the exercise of its sole and absolute discretion.

5. LICENSE TO TAKE CERTAIN LEASING ACTIONS

5.1 Grant of License

The Lender grants to the Borrower a conditional license, subject to the Lender's rights under this Assignment, to perform the obligations of the landlord under the AACI Lease and to enforce the performance by the Tenant of its obligations under the AACI Lease, short of terminating or declaring a default under the AACI Lease.

5.2 EXCLUDED LEASING ACTIONS

Any Leasing Action not expressly authorized under <u>Section 5.1</u> is expressly excluded from the scope of the license granted under that Section. If the leasing configuration of the Improvements changes so that Leases other than the AACI Lease exist, the Lender may, at its sole and absolute discretion, and in accordance with the Lender's then-current servicing policies, grant to the Borrower the license to take certain categories of Leasing Actions with respect to such Leases without the Lender's advance written consent.

6. LENDER'S APPROVAL OF LEASING ACTIONS

All Leasing Actions that the Borrower is not expressly licensed to take under Section 5 require the Lender's advance written approval. The Borrower shall request such approval in writing, presenting the terms of the proposed Leasing Action in summary form. The request shall be accompanied by (i) a copy of the form of lease, lease amendment, or other written instrument that is to effect the proposed Leasing Action, and (ii) any financial materials (such as credit reports, tenant financial statements, or retail tenant sales information) used by the Borrower in arriving at its decision to take the proposed Leasing Action. The Lender may within fifteen (15) Business Days of its receipt of the Borrower's request, and in the exercise of its reasonable discretion, request any additional documentation required to permit its analysis of the proposed Leasing Action. Unless the Lender declines a request for its approval of a Leasing Action by Notice within fifteen (15) Business Days of its receipt, together with all documentation required under this Section, the Lender shall be deemed to have approved the request.

7. BORROWER'S REPRESENTATIONS AND WARRANTIES

The Borrower represents and warrants as follows:

7.1 THE BORROWER'S EXCLUSIVE RIGHT TO ASSIGN

The Borrower is the owner in fee simple absolute of the Real Property, has good title to the Leases and Rents and has good right to assign them to Lender. No other natural or legal person has any right, title or interest to the Borrower's interest in the Leases and Rents.

7.2 No Landlord Defaults

The Borrower has duly and punctually performed all of the landlord's obligations, covenants, conditions and warranties under the terms of the Leases.

7.3 NO TENANT DEFAULTS

To the Borrower's best knowledge as a duly diligent property owner, no tenant under a Lease is in material default in the performance of its terms, except as disclosed in the estoppel certificates delivered to the Lender in connection with the Loan, an aged receivables/delinquency report delivered by the Borrower to the Lender in connection with the Loan, or an exhibit to the Borrower's Closing Certificate of even date herewith from the Borrower to the Lender.

7.4 No Previous Assignment in Force

The Borrower has not previously sold, assigned, transferred, mortgaged, or pledged the Leases or the Rents except under documents that have been discharged and released in full.

7.5 STATUS OF LEASES

The Leases delivered to the Lender in connection with the closing of the Loan are valid, unmodified (except pursuant to modifications that have been delivered to the Lender) and are in full force and effect.

7.6 STATUS OF FUTURE RENTS

No Rent that will accrue under a Lease has been waived, released, discounted, set off or otherwise discharged or compromised.

7.7 NO RENT RECEIVED IN ADVANCE

The Borrower has not received any funds or deposits from the tenant under any Lease in excess of one (1) month's Rent, other than security deposits or advance rents in respect of periods of the rental term that have elapsed.

8. **BORROWER'S COVENANTS**

8.1 Performance of Obligations

The Borrower shall observe, perform and discharge, duly and punctually, the Borrower's obligations, covenants, conditions and warranties under the terms of the Note, the Trust Deed, this Assignment, the other Loan Documents, and the Leases.

8.2 TENANT PERFORMANCE

The Borrower shall use commercially reasonable efforts to cause the tenants under the Leases to perform their obligations under the Leases.

8.3 LEASING ACTIONS

The Borrower shall take no Leasing Action without the Lender's advance written approval, except as expressly permitted under the license granted to the Borrower under <u>Section 5</u> of this Assignment.

8.4 DOCUMENTATION OF LEASING ACTIONS REQUIRING LENDER'S APPROVAL

The Borrower shall, promptly upon execution, send the Lender final documentation evidencing any Leasing Action requiring Lender's approval.

8.5 ACTIONS AND PROCEEDINGS

The Borrower shall appear in and defend any action or proceeding arising under, or connected with the Leases or the obligations, duties or liabilities of the Borrower and the tenants under the Leases.

8.6 FURTHER ASSURANCES

The Borrower shall execute and deliver to the Lender from time to time such further assignments and instruments as the Lender reasonably may request in order to effectuate the intent of this Assignment.

8.7 NOTICES OF LANDLORD DEFAULT

If the Borrower receives any written notice from any tenant asserting a material default by the landlord under a Lease, or advising the Borrower that a condition exists which may become a material default with the passage of time, the Borrower shall send a copy or memorandum of the notice to the Lender.

8.8 RENT ROLLS

If a Revocation Event has occurred, the Borrower shall, within ten (10) days after receipt of the Lender's written request, furnish to the Lender a rent roll, certified true and correct by the Borrower, in the form required under the terms of the Trust Deed, and setting forth any other information reasonably requested by the Lender.

8.9 NOTICE TO TENANTS

The Borrower agrees upon written request of the Lender following a Revocation Event, to notify the tenants under the Leases of this Assignment, to direct them in writing to send the Lender, simultaneously, copies of all notices of default that they serve on the Borrower, and to direct them, at the Lender's request, to pay all future Rent directly to the Lender. The Rents and copies of such notices shall be sent to the Lender at such address as is specified by the Lender to tenants from time to time.

8.10 FUTURE ASSIGNMENTS

The Borrower shall not create or permit any lien, charge, or encumbrance of the Leases or of the Rents, and shall not pledge, transfer, or otherwise assign the

Leases or the Rents unless at the Lender's request, or unless otherwise agreed to by the Lender in writing.

8.11 CONSENT TO ASSIGNMENT OF TENANTS' INTERESTS

. •

The Borrower shall consent to neither an assignment of the tenant's interest in any Lease nor to any tenant's subletting all or any portion of the Real Property leased by it except to the extent such consent expressly may be required by the terms and conditions of Leases.

8.12 GENERAL SERVICE ADMINISTRATION LEASES

If at any time the Borrower shall execute any Lease with the General Services Administration or any other federal agency, the Borrower shall immediately (i) cause all of the conditions and provisions of the federal Assignment of Claims Act and the Assignment of Contracts Act to be complied with in full as additional security for the Obligations, and (ii) provide the Lender with the name, address and telephone number of the contracting officer and of the disbursement officer associated with such Lease.

9. NOTICE TO FUTURE TENANTS CONCERNING ATTORNMENT

By occupying any part of the Real Property under a Lease, each future tenant, at the option of the Lender or another New Owner, shall be deemed to have agreed to attorn to the New Owner as successor landlord, subject to the Lender's or New Owner's agreement not to disturb such tenant under its Lease so long as tenant is not in default thereunder. The recording of this Assignment is intended to impart notice to all future tenants of the foregoing provision of this Assignment. If the new Lease has been entered into in accordance with the terms of the license granted to the Borrower in this Assignment, the New Owner shall accept the tenant's attornment and shall recognize the Lease as a direct lease between the New Owner and the tenant.

10. LENDER'S RIGHTS UPON DEFAULT

10.1 REVOCATION OF LICENSES

Upon Default, the Lender may by Notice to the Borrower immediately terminate the Borrower's licenses under either or both of Sections 4 and 5 of this Assignment, regardless of whether the Real Property or any other collateral adequately secures the Loan's eventual repayment. Upon the termination of the Borrower's license under Section 4, the Borrower shall immediately deliver to the Lender all Rents then in the Borrower's possession, and all Rents then due or accruing thereafter shall be payable by tenants directly to the Lender. This Assignment shall constitute a direction to and full authority to any tenant of the Real Property, upon the Lender's written request, to pay all Rents to the Lender, without requiring the Lender to prove to the tenant the existence of Default. The Borrower agrees to deliver immediately to the Lender any Rents received by the Borrower after the revocation of the Borrower's license under Section 4, and at the Lender's written request, shall execute such further assignments to the Lender of any Lease as the Lender may in its sole judgment request. This Assignment is given in connection with the Loan and in support of the performance of the

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Borrower's Obligations, and nothing herein contained shall be construed as (a) constituting the Lender a "mortgagee-in-possession" of the Real Property, or (b) an assumption by the Lender of the Borrower's obligations as landlord under the Leases.

10.2 APPLICATION OF RENTS

The Lender shall apply Rents it collects as follows: (i) first, to the payment of late and other charges, if any, due and payable under the Loan Documents; (ii) second, to the repayment of any sums advanced by the Lender for the payment of any insurance premiums, taxes, assessments or other impositions or charges against the Real Property; (iii) third, to the payment of any other sums due from the Borrower to the Lender pursuant to the Loan Documents (other than the amounts described in clauses (v) and (vi) below); (iv) fourth, to the payment of any obligations of the Borrower under the Environmental Indemnity Agreement; (v) fifth, to the payment of interest and principal then due under the Note; (vi) sixth, to the establishment and maintenance of an impound account for the payment of impositions on the Real Property in accordance with the Loan Documents; (vii) seventh, to the payment to unaffiliated third parties of ordinary expenses incurred in connection with operation of the Real Property, including reasonable and customary third-party management fees not exceeding four percent (4%) of effective gross income; (viii) eighth, to establish a fund to be held by the Lender in its general account, without interest, as additional security for the Loan pending the cure of all Defaults, and to be disbursed by the Lender in its reasonable discretion to permit such Defaults to be cured; and (ix) ninth, after the cure of all Defaults and only thereafter, the balance of the Rents shall be distributed to the Borrower or to the order of the Borrower.

10.3 NO ACCORD AND SATISFACTION OR WAIVER

The Borrower agrees that the Lender's exercise of its rights under this Section shall give rise to neither (a) an accord and satisfaction with respect to any obligation not fully performed by the Borrower or completely satisfied through the application of Rents by the Lender, nor (b) a waiver of any rights or remedies of the Lender.

10.4 **DEFAULT INTEREST**

Default under this Assignment is a "Default" under the terms of the Trust Deed. The Lender is therefore entitled, at its sole discretion, to elect for interest on the Loan to accrue at the Default Rate specified in the Note until the Default is cured.

10.5 REINSTATEMENT OF THE BORROWER'S LICENSES

Upon the cure of all Defaults, the Lender may by Notice to the Borrower, reinstate the licenses of the Borrower under <u>Sections 4 and 5.1</u> of this Assignment.

10.6 ADDITIONAL OREGON REMEDIES

The Borrower expressly agrees that the Lender shall have, in addition to all other rights and remedies set forth elsewhere in this Assignment, all the rights

regarding enforcement of assignments of rents and leases, or otherwise available under Oregon law.

11. LENDER'S RIGHTS UPON OCCURRENCE OF A MAJOR TENANT BANKRUPTCY EVENT

11.1 REVOCATION OF LICENSES

Upon the occurrence of a Major Tenant Bankruptcy Event, the Borrower's license under <u>Sections 4 and 5.1</u> shall automatically terminate, but, in the absence of Default, only as to the related Lease.

11.2 APPLICATION OF RENTS

If a Major Tenant Bankruptcy Event occurs and no Default exists, and unless the related Lease has been rejected in bankruptcy, the Lender shall apply the Rents so received to any late charge or monthly payment then due and payable on the Loan, disbursing any excess amounts to the Borrower within ten (10) Business Days, If no such monthly payment is due and payable when such Rent is received, the Lender shall disburse such Rent to the Borrower, net of the amount of the next monthly payment, which amount shall be held by the Lender and applied to such payment when it is due. If a Default exists, any Rents received following a revocation under this Section of the license granted to the Borrower under Section 4 shall be applied in the order of priority described in Subsection 10.2. If no Default exists, but the related Lease has been rejected in bankruptcy, any amount received in respect of the related Lease shall be held in a reserve fund as described in Subsection 10.2(viii) above, provided, however, that such funds shall be made available for approved leasing expenses and tenant improvements, and shall be released to the Borrower only when the space demised by the rejected Lease has been re-leased and occupied under an approved Lease.

11.3 REINSTATEMENT OF THE BORROWER'S LICENSES

If a Major Tenant Bankruptcy Event occurs and no Default exists, and either (a) a plan is confirmed in the related tenant's bankruptcy and the plan does not materially modify the terms of the related Lease, or (b) the trustee or the debtorin-possession assumes the related Lease under 11 U.S.C. §365, the Lender may, in its sole and absolute discretion, by Notice to the Borrower, reinstate, as to the related Lease, the license granted to the Borrower under Section 4 of this Assignment.

12. LENDER'S RIGHTS IN RESPECT OF MATERIAL TENANT LOCs

If the Borrower has the right to draw a Material Lease LOC, and if, in the Lender's reasonable determination, the Loan-to-Value ratio after any related lease termination will exceed seventy-five percent (75%), or if the debt service coverage ratio of the Loan is below 1.25 or may fall below 1.25 during the following two years, based on Leases remaining in force after any related lease termination and on scheduled tenant rollover, the Lender may, at its sole and absolute discretion, direct the Borrower to draw on the

Material Lease LOC and to instruct the issuer to remit the proceeds directly to the Lender. Alternatively, the Lender may direct that the Borrower receive such proceeds and turn them over to the Lender. In the absence of Default, the Lender shall hold such proceeds in a reserve account to fund retenanting costs under approved Leases. If a Default exists and a right to draw exists under a Material Lease LOC, the Lender may, at its sole and absolute discretion, issue a direction as described above. If a Default exists, such proceeds shall be held by the Lender as additional security for the Loan, or applied as a payment in accordance with the Loan Documents. If the Lender issues a direction to the Borrower under this Section, the Borrower shall promptly comply with the direction. The Borrower acknowledges that any loss or waiver of draw rights resulting from the failure of the Borrower to comply with such a direction may constitute waste of the Real Property under the terms of the Loan Documents, and that any use of the proceeds of any Material Lease LOC, except in compliance with this Section, shall constitute the misappropriation of such proceeds under the terms of the Loan Documents.

13. POWER OF ATTORNEY

The Borrower appoints the Lender as its attorney-in-fact, coupled with an interest, with full power of substitution, in the name, place, and stead of the Borrower to do, while a Default exists, all things and to perform all acts with respect to the Leases and the Real Property authorized by the terms of this Assignment, as the Lender may determine from time to time in its discretion.

14. WAIVER OF CLAIMS

The Borrower waives any right, claim, or demand it may now or hereafter have against any tenant by reason of payment of Rents to the Lender at the Lender's request following a Revocation Event.

15. LENDER NOT MORTGAGEE-IN-POSSESSION

Acceptance by the Lender of this Assignment shall not, prior to entry upon and taking of possession of the Real Property by the Lender, be deemed or construed to constitute the Lender a mortgagee in possession of the Real Property, nor shall the Lender be deemed to have assumed, by accepting this Assignment, the landlord's obligations to any tenant. In particular, acceptance by Lender of this Assignment shall not obligate the Lender (a) to appear in or to defend any action or proceeding relating to the Leases or to the Real Property, (b) to perform any obligation as landlord under the Leases, (c) to pay any amount or to assume any future financial obligation of the landlord, including any obligation to pay to any tenant a security or other deposit not actually received by the Lender, or (d) to indemnify any tenant for any injury or damage to person or property sustained by any person or persons, firm or corporation in or about the Real Property.

16. WAIVER OF JURY TRIAL

THE BORROWER AND THE LENDER WAIVE ANY RIGHT TO A TRIAL BY JURY IN ANY ACTION OR PROCEEDING TO ENFORCE OR DEFEND ANY RIGHTS (A) UNDER THIS ASSIGNMENT OR ANY OTHER LOAN DOCUMENT, OR (B) ARISING FROM ANY LENDING RELATIONSHIP EXISTING IN

CONNECTION WITH THIS ASSIGNMENT, AND IT IS AGREED BY THE BORROWER AND BY THE LENDER THAT ANY SUCH ACTION OR PROCEEDING SHALL BE TRIED BEFORE A JUDGE AND NOT BEFORE A JURY.

17. CUMULATIVE REMEDIES

The Lender may take or release other security, may release any party primarily or secondarily liable for any Obligation, may grant extensions, renewals or indulgences with respect to such indebtedness, and may apply any other security therefor held by it to the satisfaction of such indebtedness without prejudice to any of its rights hereunder. Nothing herein contained and no act or omission by the Lender pursuant to the powers and rights granted it herein shall be deemed to be a waiver by the Lender of its rights and remedies under any of the Loan Documents, or shall prejudice any of the rights and remedies possessed by the Lender under their terms. The right of the Lender to collect the Loan or additional Obligations may be exercised by the Lender prior to, simultaneously with, or subsequently to any action taken by the Lender under this Assignment.

18. EXPENSES

Any expenses incurred by the Lender in exercising its remedies under this Assignment after the occurrence of a Revocation Event (including attorneys' fees and costs in enforcing or protecting this Assignment in any bankruptcy proceeding) shall constitute further indebtedness of the Borrower to the Lender and shall be immediately payable to the Lender, together with interest at the Default Rate specified in the Note.

19 INDEMNIFICATION

The Borrower hereby agrees to indemnify, defend, and hold the Lender harmless from and against any and all liability, loss, damage or expense (unless such liability, loss, damage or expenses arises through the Lender's gross negligence or willful misconduct) which the Lender may or might incur under or by reason of this Assignment, or for any lawful action taken by the Lender hereunder, or by reason or in defense of any and all claims and demands whatsoever which may be asserted against the Lender arising out of the Leases, including, without limitation, any claim by any tenant of credit for Rent paid to and received by the Borrower, but not delivered to the Lender, for any period under any Leases more than one month in advance of the due date thereof; and should the Lender incur any such liability, loss, damage or expense, the amount thereof (including reasonable attorneys' fees) with interest thereon at the rate specified as the Default Rate in the Note shall be payable by the Borrower immediately without demand, and shall be secured hereby and by the Trust Deed.

20. NOTICE

In order for any demand, consent, approval or other communication to be effective under the terms of this Assignment, "Notice" must be provided under the terms of this Section. All Notices must be in writing. Notices may be (a) delivered by hand, (b) transmitted by facsimile (with a duplicate copy sent by first class mail, postage prepaid), (c) sent by certified or registered mail, postage prepaid, return receipt requested, or (d) sent by

reputable overnight courier service, delivery charges prepaid. Notices shall be addressed as set forth below:

If to the Lender:

Transamerica Life Insurance Company c/o AEGON USA Realty Advisors, Inc. 4333 Edgewood Road, N.E. Cedar Rapids, Iowa 52499-5443 Attn: Mortgage Loan Department

Reference: Loan #89577 Fax Number: (319) 369-2277

If to the Borrower:

Advanced American Construction Properties, LLC 8444 NW St. Helens Road Portland, Oregon 97231 Attn: Marvin D. Burch Fax Number: (503) 650-8230

Notices delivered by hand or by overnight courier shall be deemed given when actually received or when refused by their intended recipient. Notices sent by facsimile will be deemed delivered when a legible copy has been received (provided receipt has been verified by telephone confirmation or one of the other permitted means of giving Notices under this Section). Mailed Notices shall be deemed given on the date of the first attempted delivery (whether or not actually received). Either the Lender or the Borrower may change its address for Notice by giving at least fifteen (15) Business Days' prior Notice of such change to the other party.

21. SUCCESSORS AND ASSIGNS

The terms, covenants, conditions and warranties contained herein and the powers granted hereby shall run with the land, shall inure to the benefit of and bind the parties hereto and their respective heirs, executors, administrators, successors and assigns, and all tenants, sub-tenants and assigns of same, and all occupants and subsequent owners of the Real Property.

22. CHOICE OF LAW

This Assignment shall be construed and enforced according to, and governed by, the laws of Oregon without reference to conflicts of laws provisions which, but for this provision, would require the application of the law of any other jurisdiction.

23. TIME OF ESSENCE

Time shall be of the essence in the Borrower's performance of its obligations under this Assignment.

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AAC Headquarter Building, Portland, Oregon AEGON Loan No. 89577 Seattle-3289153.2 0027988-00443

24. SEVERABILITY

In the event that any one or more of the provisions of this Assignment shall for any reason be held to be invalid, illegal or unenforceable, in whole or in part, or in any respect, or in the event that any one or more of the provisions of this Assignment shall operate, or would prospectively operate, to invalidate this Assignment, then, and in any such event, such provision or provisions only shall be deemed to be null and void and of no force or effect, and shall not affect any other provision of this Assignment which other provisions shall remain operative and in full force and effect and shall in no way be affected, prejudiced or disturbed thereby.

25. AMENDMENT

This Assignment may be amended, revised, waived, discharged, released or terminated only by a written instrument or instruments executed by the party against which enforcement of the amendment, revision, waiver, discharge, release or termination is asserted. Any alleged amendment, revision, waiver, discharge, release or termination that is not so documented shall be null and void.

26 VARIATION IN PRONOUNS

All the terms and words used in this Assignment, regardless of the number and gender in which they are used, shall be deemed and construed to include any other number, singular or plural, and any other gender, masculine, feminine, or neuter, as the context or sense of this Assignment or any paragraph or clause herein may require, the same as if such word had been fully and properly written in the correct number and gender.

27. CAPTIONS

The section titles or captions contained in this Assignment are for convenience only and shall not be deemed to define, limit or otherwise modify the scope or intent of this Assignment.

28. COUNTERPARTS

This Assignment may be executed in one or more counterparts, each of which shall be deemed an original but all of which taken together shall constitute one and the same agreement.

29. TERMINATION

Upon discharge of record of the Trust Deed and payment in full of all monetary obligations under the Note, this Assignment shall terminate without the need for any separate instrument of discharge; provided that if the Borrower requests a termination in recordable form, the Lender shall provide one, at the Borrower's expense.

IN WITNESS WHEREOF, the Borrower has caused this Absolute Assignment of Leases and Rents to be duly executed as of the date first above written.

BORROWER:

ADVANCED AMERICAN CONSTRUCTION PROPERTIES, LLC, an Oregon limited liability company

By:

Marvin D. Burch Its Authorized Member

STATE OF OREGON

COUNTY OF Multional

This instrument was acknowledged before me on April 21, 2006, by MARVIN D. BURCH, as the Authorized Member of ADVANCED AMERICAN CONSTRUCTION PROPERTIES, LLC, an Oregon limited liability company, on its behalf.

Notary Public as

My commission expires: _________

Commission No.: 3595

VICKI LEE KRYSZAK

OFFICIAL SEAL
VICKI LEE KRYSZAK
NOTARY PUBLIC-OREGON
CONIMISSION NO. 359559
MY COMMISSION EXPIRES AUGUST 10, 2006

359 559

EXHIBIT A

Legal Description:

PARCEL 1:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning on the north line of Block C, Springville, now vacated, with the intersection of the northeasterly line of the Spokane, Portland & Seattle Railway right-of-way; thence North 52 East 292.9 feet; thence North 38 46' West 70 feet; thence South 52 West 300.7 feet; thence South 45 06' East 70.53 feet to the place of beginning.

PARCEL 2:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at the southeasterly corner of the tract of land conveyed to Portland Manufacturing Company by deed recorded April 8, 1936 in Book 332, Page 556, Deed Records, said point also being on the northerly line of the tract of land conveyed to L.A. Jacobsen by deed recorded May 24, 1921 in Book 853, Page 8, Deed Records; thence South 52 West along the northerly line of said Jacobsen tract 289 feet to the northeasterly line of the Northern Pacific Railroad right-of-way also referred to as the Spokane, Portland & Seattle Railway right-of-way; thence Northwesterly along said northeasterly right-of-way line to its intersection with the easterly extension of the southeasterly line of Ferry Street, said point also being the southwest corner of the tract of land conveyed to Multnomah County by deed recorded July 12, 1912 in Book 586, Page 347, Deed Records; thence North 52 East 292.9 feet to the low water mark of the Willamette River; thence Southeasterly along said low water mark to the place of beginning.

PARCEL 3:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at a point on the northeasterly line of the Spokane, Portland & Seattle Railway right-of-way which is North 38 West 3.94 feet from the southeasterly line of Lot 2, Block 3, on the plat of Springville, recorded in Book G, Page 255, Deed Records; thence Northwesterly along said northeasterly right-of-way line 751.17 feet to a point which is North 38 West 753.94 feet from the southeast corner of aforesaid Lot 2; thence North 52 East parallel with the southeasterly line of said Lot 2, a distance of 289 feet to the harbor line of the Willamette River; thence South 48 13' 44" East along said harbor line 762.10

feet to a point which is North 52 East from the point of beginning; thence South 52 West 401.77 feet to the place of beginning.

EXCEPT that portion lying below the low water line of the Willamette River.

FURTHER EXCEPTING the tract of land conveyed to Multnomah County by deed recorded September 16, 1929 in Book 29, Page 28, Deed Records, described as follows:

Beginning at a point on the harbor line of the Willamette River which is 80 feet Northerly from, when measured at right angles to the centerline of N. Philadelphia Avenue, extended Westerly, said point also being 204 feet Southerly from the northeast corner of Parcel 3 as above described; thence Westerly parallel with the extended centerline of said street 100 feet; thence Southerly at right angles 30 feet; thence Westerly parallel with the extended centerline of said street, 205 feet to a point on the northeasterly right-of-way line of the Spokane, Portland and Seattle Railway which is 50 feet Northerly from, when measured at right angles to, said extended street centerline; thence Southerly along said right-of-way line to a point which is 50 feet Southerly from, when measured at right angles to, said extended street centerline; thence Easterly parallel with the westerly extension of the centerline of N. Philadelphia Avenue 194 feet; thence Southerly at right angles 30 feet; thence Easterly, parallel with said extended street centerline 140 feet to a point on the harbor line which is 80 feet Southerly from, when measured at right angles to, said extended street centerline; thence Northerly along said harbor line 164.9 feet to the place of beginning.

PARCEL 4:

A tract of land in the Southeast 1/4 of Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at a 5/8" iron rod w/yellow plastic cap (YPC) "Caswell PLS 737" shown as a set monument on Multnomah County Survey #50640, which bears South 34 degrees 08'07" East, 2337.09 feet from the Witness Corner of the S.E. Corner of the G.J. Watts DLC #46, said rod located at the intersection of the Southerly right-of-way line (ROW) of the St. Helens Bridge and the Southwesterly ROW of the Northern Pacific R.R. railroad; thence Southeasterly 272.28 feet along aforementioned railroad ROW on the arc of a 3706.79 foot radius curve to the right (the chord of which bears S37 degrees 15'40" E, 272.22 feet) to a 5/8" iron rod w/YPC "City of Portland Water Bureau"; thence S54 degrees 46'42"W, 82.72 feet to a 5/8" iron rod w/YPC "City of Portland Water Bureau" on the Northeasterly ROW line of Columbia River Highway (Hwy 30); thence N35 degrees 33'46" W, 275.72 feet along the aforementioned Northeasterly ROW line of Columbia River Highway (Hwy 30) to its intersection with the Southerly ROW line of the St. John's Bridge to a 5/8" iron rod shown as a set monument on Multnomah County Survey #50640; thence N57 degrees 35'18" E, 74.76 feet along the Southerly ROW of the St. Johns Bridge to its intersection with aforementioned Northern Pacific R.R. ROW line to the point of beginning.

PARCEL 5:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at the intersection of the northwesterly line and its southwesterly extension of Lots 3 and 8, Block 1, Springville, now vacated, said line also being the northerly line of Tax Lot 10 as shown by the 1940 Tax Roll, with the northeasterly line of NW St. Helens Road (as existed in 1952); thence Southeasterly along said northeasterly road line 26.6 feet to the northwest corner of the tract of land conveyed to Multnomah County by deed recorded September 27, 1929 in Book 31, Page 288, Deed Records; thence North 55 48' East along the northwesterly line of said tract 128 feet, more or less, to the southwesterly line of the Spokane, Portland and Seattle Railway right-of-way; thence Northwesterly along said southwesterly right-of-way line to the northwesterly line of aforesaid Lot 3, Block 1, Springville; thence Southwesterly along said northwesterly line and its southwesterly extension of Lots 3 and 8, Block 1, Springville, now vacated, to the place of beginning.

EXCEPTING THEREFROM that portion acquired by the State of Oregon by and through its State Highway Commission, Circuit Court Case No. 282435, Multnomah County, Oregon.

PARCEL 6:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at the intersection of the southeasterly line of Lot 2, Block 1, Springville, now vacated, with the southwesterly line of the Spokane, Portland and Seattle Railway right-of-way; thence Northwesterly along said right-of-way line to the northwesterly line of Block C, Springville, now vacated; thence Southwesterly along said northwesterly block line and its southwesterly extension to the northeasterly line of NW St. Helens Road (as existed in 1952); thence Southeasterly along said northeasterly road line to its intersection with the southwesterly extension of the southeasterly line of Lot 9, Block 1, Springville, now vacated; thence Northeasterly to the point of beginning; TOGETHER WITH the right to use the roadway under the West end of the St. Johns Bridge.

EXCEPTING THEREFROM that portion acquired by the State of Oregon by and through its State Highway Commission, Circuit Court Case No. 282435, Multnomah County, Oregon.

COMPLETION NOTICE

Notice is hereby given that the building, structure or other improvement on the following described premises (insert legal description including street address, if known):

As Per Exhibit Attached Hereto And By Reference Made A Part Hereof and also known as 8444 NW St. Helens Road, Portland, Oregon 97231

Dated April 2/		, 18x 2006
		Advanced American Construction Properties, LL
		Original Contractor, Owner or Mortgagee
		By Man J. Bund
		Marvin D. Burch, Its Authorized Member
		P. O. Address
STATE OF OREGON	<u> </u>	
County of Multnomah) ss.)	
ı, Marvin D. Burch		rican Construction Properties, LLC
OFFICIAL SEAL VICKI LEE XRYSZI NOTARY PUBLIC-OREG COMMISSION NO. 3598 MY COMMISSION EXPIRES AUGUS	Signed a Signed a Signed a Signed a	Marvin D. Burch, It's Authorized Member and sworn to before me onApril
ecord with recording officer within 5 days after p Ol	osting, RS 87.045(3).	STATE OF OREGON,
fter recording return to (Name, Address, Zip):		Recorded in MULTNOMAH COUNTY, OREGON C. Swick, Deputy Clerk
Marvin D. Burch		
dvanced American Constructi		A65 4 ATKLM
Advanced American Constructi		A65 4 ATKLM Total: 31.00
dvanced American Constructi		
dvanced American Constructi		Total: 31.00

EXHIBIT "A"

PARCEL 1:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning on the north line of Block C, Springville, now vacated, with the intersection of the northeasterly line of the Spokane, Portland & Seattle Railway right-of-way; thence North 52° East 292.9 feet; thence North 38° 46' West 70 feet; thence South 52° West 300.7 feet; thence South 45° 06' East 70.53 feet to the place of beginning.

PARCEL 2:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnoman County, Oregon, described as follows:

Beginning at the southeasterly corner of the tract of land conveyed to Portland Manufacturing Company by deed recorded April 8, 1936 in Book 332, Page 556, Deed Records, said point also being on the northerly line of the tract of land conveyed to L.A. Jacobsen by deed recorded May 24, 1921 in Book 853, Page 8, Deed Records; thence South 52° West along the northerly line of said Jacobsen tract 289 feet to the northeasterly line of the Northern Pacific Railroad right-of-way also referred to as the Spokane, Portland & Seattle Railway right-of-way; thence Northwesterly along said northeasterly right-of-way line to its intersection with the easterly extension of the southeasterly line of Ferry Street, said point also being the southwest corner of the tract of land conveyed to Multnomah County by deed recorded July 12, 1912 in Book 586, Page 347, Deed Records; thence North 52° East 292.9 feet to the low water mark of the Willamette River; thence Southeasterly along said low water mark to the place of beginning.

PARCEL 3:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at a point on the northeasterly line of the Spokane, Portland & Seattle Railway right-of-way which is North 38° West 3.94 feet from the southeasterly line of Lot 2, Block 3, on the plat of Springville, recorded in Book G, Page 255, Deed Records; thence Northwesterly along said northeasterly right-of-way line 751.17 feet to a point which is North 38° West 753.94 feet from the southeast corner of aforesaid Lot 2; thence North 52° East parallel with the southeasterly line of said Lot 2, a distance of 289 feet to the harbor line of the Willamette River; thence South 48° 13′ 44″ East along said harbor line 762.10 feet to a point which is North 52° East from the point of beginning; thence South 52° West 401.77 feet to the place of beginning.

EXCEPT that portion lying below the low water line of the Willamette River.

FURTHER EXCEPTING the tract of land conveyed to Multnomah County by deed recorded September 16, 1929 in Book 29, Page 28, Deed Records, described as follows:

Beginning at a point on the harbor line of the Willamette River which is 80 feet Northerly from, when

measured at right angles to the centerline of N. Philadelphia Avenue, extended Westerly, said point also being 204 feet Southerly from the northeast corner of Parcel 3 as above described; thence Westerly parallel with the extended centerline of said street 100 feet; thence Southerly at right angles 30 feet; thence Westerly parallel with the extended centerline of said street, 205 feet to a point on the northeasterly right-of-way line of the Spokane, Portland and Seattle Railway which is 50 feet Northerly from, when measured at right angles to, said extended street centerline; thence Southerly along said right-of-way line to a point which is 50 feet Southerly from, when measured at right angles to, said extended street centerline; thence Easterly parallel with the westerly extension of the centerline of N. Philadelphia Avenue 194 feet; thence Southerly at right angles 30 feet; thence Easterly, parallel with said extended street centerline 140 feet to a point on the harbor line which is 80 feet Southerly from, when measured at right angles to, said extended street centerline; thence Northerly along said harbor line 164.9 feet to the place of beginning.

PARCEL 4:

A tract of land in the Southeast 1/4 of Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at a 5/8" iron rod w/yellow plastic cap (YPC) "Caswell PLS 737" shown as a set monument on Multnomah County Survey #50640, which bears South 34 degrees 08'07" East, 2337.09 feet from the Witness Corner of the S.E. Corner of the G.J. Watts DLC #46, said rod located at the intersection of the Southerly right-of-way line (ROW) of the St. Helens Bridge and the Southwesterly ROW of the Northern Pacific R.R. railroad; thence Southeasterly 272.28 feet along aforementioned railroad ROW on the arc of a 3706.79 foot radius curve to the right (the chord of which bears S37 degrees 15'40" E, 272.22 feet) to a 5/8" iron rod w/YPC "City of Portland Water Bureau"; thence S54 degrees 46'42"W, 82.72 feet to a 5/8" iron rod w/YPC "City of Portland Water Bureau" on the Northeasterly ROW line of Columbia River Highway (Hwy 30); thence N35 degrees 33'46" W, 275.72 feet along the aforementioned Northeasterly ROW line of Columbia River Highway (Hwy 30) to its intersection with the Southerly ROW line of the St. John's Bridge to a 5/8" iron rod shown as a set monument on Multnomah County Survey #50640; thence N57 degrees 35'18" E, 74.76 feet along the Southerly ROW of the St. Johns Bridge to its intersection with aforementioned Northern Pacific R.R. ROW line to the point of beginning.

PARCEL 5:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at the intersection of the northwesterly line and its southwesterly extension of Lots 3 and 8, Block 1, Springville, now vacated, said line also being the northerly line of Tax Lot 10 as shown by the 1940 Tax Roll, with the northeasterly line of NW St. Helens Road (as existed in 1952); thence Southeasterly along said northeasterly road line 26.6 feet to the northwest corner of the tract of land conveyed to Multnomah County by deed recorded September 27, 1929 in Book 31, Page 288, Deed Records; thence North 55° 48' East along the northwesterly line of said tract 128 feet, more or less, to the southwesterly line of the Spokane, Portland and Seattle Railway right-of-way; thence Northwesterly along said southwesterly right-of-way line to the northwesterly line of aforesaid Lot 3, Block 1, Springville; thence Southwesterly along said northwesterly line and its southwesterly extension of Lots 3 and 8, Block 1, Springville, now vacated, to the place of beginning.

EXCEPTING THEREFROM that portion acquired by the State of Oregon by and through its State Highway Commission, Circuit Court Case No. 282435, Multnomah County, Oregon.

PARCEL 6:

A tract of land in Section 11, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, Multnomah County, Oregon, described as follows:

Beginning at the intersection of the southeasterly line of Lot 2, Block 1, Springville, now vacated, with the southwesterly line of the Spokane, Portland and Seattle Railway right-of-way; thence Northwesterly along said right-of-way line to the northwesterly line of Block C, Springville, now vacated; thence Southwesterly along said northwesterly block line and its southwesterly extension to the northeasterly line of NW St. Helens Road (as existed in 1952); thence Southeasterly along said northeasterly road line to its intersection with the southwesterly extension of the southeasterly line of Lot 9, Block 1, Springville, now vacated; thence Northeasterly to the point of beginning; TOGETHER WITH the right to use the roadway under the West end of the St. Johns Bridge.

EXCEPTING THEREFROM that portion acquired by the State of Oregon by and through its State Highway Commission, Circuit Court Case No. 282435, Multnomah County, Oregon.

LEVEL ONE ENVIRONMENTAL PROPERTY ASSESSMENT

for the property located at

RIVERSIDE INDUSTRIAL PARK PORTLAND, OREGON



PBS ENVIRONMENTAL 1220 S.W. Morrison St. Portland, OR 97205 (503) 248-1939

PBS Project Number 5385.00

November 1993



2.0 SITE BACKGROUND

This section presents a brief description of the site, the ownership and operational history, as well as the regulatory history. This information was collected from a variety of sources including DEQ files, previous reports, site reconnaissance, online resources, and a VISTA Report. The site is referred to as the Marine Finance site throughout this report, but the site has also historically been identified as the Riverside Industrial Park, the General-Knapton Road Site, and the West State, Inc. site.

2.1 SITE DESCRIPTION

The Marine Finance site is located along the western edge of the Lower Willamette River in Portland, Oregon (Figure 2-1). The St. Johns Bridge extends over the center of the property and therefore divides the site into a northern section, which is approximately 2/3 of the total site area, and a southern section, which is approximately 1/3 of the total site area (Figure 2-2). This document therefore refers to the northern and southern sections of the property using the St. Johns Bridge as the dividing line. The region around the site is characterized by heavy industry along the river and a mix of residential, commercial, industrial, and recreational properties west of St. Helens Road. The following summarizes the site location and ownership:

GENERAL SITE DATA

Site Name	and	Address:

Marine Finance

8444 Northwest Saint Helens Road Portland, Oregon 97231-1115

Current Owner(s):

Marine Finance Corporation 8444 Northwest Saint Helens Road

Portland, Oregon 97231-1115 Note: The February 2000 Phase One Environmental

Assessment Update was prepared for a company called Capital Consultants, 2300 S.W. First Avenue, Portland, Oregon 97201 (PBSE 2000)

Current Operators (Tenants):

Transloader International, Hendren Tow Boat Company, Mark Even Construction, Black Cat Studios, NW One

Design.

Site Contact(s):

Mike Williams

Latitude:

N 45° 35'

Longitude:

W 122° 46'

Legal Description:

The facility is located in the northeast quarter of the southeast quarter of Section 11 Township 1N, Range 1W, (Willamette Meridian, 01N01W11DA), Lots 100, 500, and

600, approximately 9.7 acres.

Directions to Site:

Located northwest of the city of Portland, beneath the southwestern end of the St. John's Bridge over the

Willamette River.

2.2 OWNERSHIP AND OPERATIONAL HISTORY

The site is currently used for office trailer storage, warehouses, an art studio, tow boat operations, sailboat construction, and houseboat construction according to information provided by representatives from Marine Finance Corporation to DEQ on 02 March 1999. Structures at the site currently consist of two large metal-clad Quonset huts on concrete slabs, a wood-frame modular office building, a small metal-clad trailer house, a small wooden shed, a floating-home builder's dock, as well as a gangway and floating facilities owned by a tow boat company. A concrete slab foundation from a former warehouse building in the southern portion of the property may still exist in part or in its entirety under some overlying soil. There are currently two docks onsite north of the St. John's Bridge. The site is currently occupied by five businesses which all lease space on a month-to-month basis:

- Transloader (Transversal) International Import/Export business. Transloader International
 occupies a trailer for its office operations and the south Quonset hut for warehousing of
 merchandise.
- Hendren Tow Boat Company Tugboat business. Hendren Tow Boat Company operates on Marine Finance property south of the St. John's Bridge. Since Hendren Tow Boat started operations at the site in 1993, it has been used as a tug boat dock. There are currently several floating structures/docks in the river adjacent to the site. Maintenance of its vessels is performed onsite.
- Mark Even Construction Houseboat construction. Mark Even Construction constructs
 houseboats on the shoreline of the Willamette River using a dock at the northern end of the
 property and has support operations and material storage in the adjacent area.
- Black Cat Studios Sculptors studio space in the northern end of the north Quonset hut.
- NW One Design Sailboat construction in the southern end of the north Quonset hut.

The history of the site was traced by PBS Environmental (PBSE) in a 1993 Phase One Report (PBSE 1993), back to 1926 by means of aerial photographs, Portland City Directories, Sanborn Fire Insurance maps, City building records, and personal interviews. In summary, the report states that the property had been used by various marine construction companies and tow boat/barge companies since the 1920's or earlier. In the past the site also had a modest warehouse in the southern portion of the site as well as smaller buildings, such as office buildings, a tavern, and a private residence. Between 1936 and 1940 the area was built up with fill material. The present day Quonset huts were constructed sometime before 1957. Much of the site was leased to two metal salvage companies from 1988 until 1993. PBS states in the 1993 report that during its site visit scrap metal covered much of the storage yard, and that direct observation of the ground surface was difficult (PBSE 1993).

In 1926, the south parcel was occupied by Jacobsen Construction Company. Activities conducted by Jacobsen included pile driving, dock work, and bridge building. Jacobsen had an equipment warehouse with an office and tool room in the south end of the parcel, located

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between the river and the railroad tracks. This building was serviced with electric power, stove heat, and city water. The historic aerial photographs depict this structure (Appendix A). Toilets and basins drained directly into the river. A dock and an overhead crane was located south of the warehouse. The adjacent property to the south was occupied by government moorings (PBSE 1993).

At the same time on the north parcel near the present location of Mark Even Construction, a cross-river ferry slip and landing was present. The ferry apparently operated until approximately 1932 when the St. Johns bridge was constructed. The Claremont Tavern, which was later renamed the Thomas Roadhouse, was present near the intersection of the ferry landing road and the railroad tracks. A private dwelling and garage appeared just south of the bridge between the railroad tracks and St. Helens Road in 1932. Jacobsen continued to occupy the remainder of the south parcel. Houseboats occupied the shoreline on the north parcel.

By 1943, the south parcel was occupied by Portland Tug and Barge, which was owned by Jacobsen Construction. The equipment warehouse remained, and a new one-story office building was constructed on the north parcel and connected to the sewer.

A 1948 aerial photo shows that fill had been placed on the north parcel, bringing it to close to its present day elevation (Appendix A). The U.S. Army Corps of Engineers (USACE) has no records of fill disposal from river dredgings on the property, which indicates that the fill material was likely obtained from private dredging operations (PBSE 1993). The 1948 aerial photo shows two elongated buildings, which appear to be warehouses, side-by-side in the center of the north parcel. In 1951, a temporary restroom was constructed on the property which was connected to a septic tank (PBSE 1993).

General Construction Company purchased the property from Jacobsen Construction Company in approximately 1953. The address for Portland Tug & Barge (8444 N.W. St. Helens Road) was listed as vacant starting in 1953 until 1957. At approximately this time, the Corps of Engineers occupied the government mooring property to the south. The present-day Quonset huts were constructed before 1957 based on review of the aerial maps (Appendix A) although the PBSE report indicates construction in 1959 (PBSE 1993). The original warehouse on the south parcel was demolished in October of 1965.

In 1972, a permit was filed by General Construction Company with the City of Portland for the grading, surfacing, and fencing of storage areas, and construction of dolphins, floats, ramps, and an oil storage building for lubricants and greases. Precise locations are uncertain, but several ancillary structures are present on the east sides of both Quonset huts in the 1972 aerial photograph that were not present in the 1971 aerial photograph (Appendix A). Additionally, much additional storage east of the Quonset huts and on the southern portion of the property is noted in 1972. Later that year, an office trailer was added on the north parcel. In 1979, a sewer

connection permit was filed by General Construction for a trailer on the south parcel (PBSE 1993).

The property was purchased from General Construction in 1988 by West State, Inc. West State intended to use the site for shop repair, however that never occurred. The buildings and property were leased in 1989 to Clydes Ferrous Metal Salvage whose office space was in the south half of the north Quonset hut, and Abrams Scrap Metal whose office space was in the south Quonset hut. Scrap metals were stored in the area east of the Quonset huts. A diving and construction company called Dutra Devine occupied the north end of the north Quonset hut and the modular office building near the north dock. Prior to Dutra Devine, the north end of the north Quonset hut was occupied by Western Boiler Repair.

Three underground storage tanks (UST) located immediately east of and adjacent to the southern Quonset hut (Figure 2-2), which were previously used by General Construction Company, were removed from the site in 1988 immediately after the purchase of the property by West State, Inc. (Dames & Moore 1988). Two USTs, a 20,000-gallon and a 10,000-gallon tank, stored diesel fuel and the third, a 5,000-gallon UST, contained gasoline. A fuel pumping island was located near the USTs by the southern Quonset hut. A fuel line also led to the dock north of the St. Johns Bridge and may have supplied fuel for river vessels and/or been a supply line for the USTs. Contaminated soil was excavated from the tank pits to depths of 15 to 26 feet below ground surface (bgs). Additional test pits were dug along the former route of the product lines, and more contaminated soil was removed. The removal project received a "No Further Action" letter from the DEQ in February 1989.

2.2.1 Previous Investigations

The site is located adjacent to River Mile (RM) 6.0, which is within a 6-mile stretch of the Lower Willamette River where the USEPA conducted a sediment study in 1997 (USEPA 1998). The USEPA sediment study area, situated between the upstream ends of Sauvie Island (RM 3.5) and Swan Island (RM 9.5), is referred to as the Portland Harbor. This study included collection of 187 near-shore sediment samples from either shallow (6 to 17 cm), or deep (55 to 139 cm) sediments. Most of the samples (150) were collected from the shallow horizon. All samples were analyzed for total metals, semi-volatile organic compounds (SVOCs), total organic carbon (TOC), and sediment grain size. Selected samples were also analyzed for organotins (specifically tributyltin (TBT)), pesticides, polychlorinated biphenols (PCB), chlorinated herbicides, and chlorinated dioxins and dibenzofurans (ODEQ 1999b, USEPA 1998).

One of the subsurface sediment samples (SD055-C) was collected adjacent to the Marine Finance site from a depth of 0 to 90 cm. Another shallow sediment sample (SD055) was collected downstream, and both a shallow (SD057) and subsurface (SD057-C) sediment sample was collected upstream of the Marine Finance site. The results exceeding the Portland Harbor



Sediment Baseline Maximum Value included copper, lead, mercury, nickel, zinc, 2-methylnaphthalene, benzoic acid, carbazole, dibenzofuran, total low molecular weight polycyclic aromatic hydrocarbons (LPAHs), total high molecular weight polycyclic aromatic hydrocarbons (HPAHs), and TOC (Table 2-1). The Marine Finance sample exceeded baseline values for 12 analytes, while the two upstream samples (SD057 and SD057-C) exceeded baseline values for two and four analytes, respectively. The downstream sample did not exceed the baseline values for any of the analytes (ODEQ 1999b). The two nearby upstream sites which are currently undergoing cleanup are the U.S. Moorings Site, and the Gasco Site (ODEQ 1999b).

The Level One (Phase One) Environmental Property Assessment Report (PBSE 1993) referenced in Section 2.2 was updated in 2000 (PBSE 2000). The 1993 report found that various items stored in the yard presented potential sources of contamination, such as empty drums taken in as salvage which once contained hazardous material, as well as electrical transformers and metal shavings. The report recommended that a visual assessment be conducted in the storage yard after Abrams Scrap Metal vacated the site to determine whether any hazardous materials may have been released on the property. The 2000 report stated that the bulk of the scrap metal in the yard had been removed, but that a large number of small pieces of plastic and metal were present within the surface soils of the former metal salvage storage yard.

2.2.2 VISTA Site Assessment Report

A Site Assessment report was ordered from VISTA Information Solutions, Inc (Vista Information Solutions, Inc. (VISTA) 2000). A copy of the report is included in Appendix B. A VISTA Site Assessment Report is a service which, given a property address, summarizes the possible sources of waste near a given site. The VISTA report for the Marine Finance site identified any nearby National Priority List (NPL) sites, Resource Conservation and Recovery Act (RCRA) Corrective Action and associated Treatment, Storage and Disposal (TSD) facilities; State Equivalent Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) sites, sites currently or formerly under review by USEPA, RCRA permitted TSD facilities, Leaking Underground Storage Tanks (LUST), sites permitted as solid waste landfills, incinerators, or transfer stations; registered USTs, Emergency Response Notification System spills (ERNS), RCRA registered small and large generators of hazardous waste, and the State spills list.

One LUST site within 1/4-1/2 mile of Marine Finance is a heating oil tank (HOT) owned by J. Illias, and is listed as having been closed in 1998. Three other sites were identified, but have no information regarding the type of LUST, are located on the opposite side of the Lower Willamette River, and are listed as having been closed in 1989 or 1990: Riverside Lumber Company, Stenno Carbon Company, and BBS Property.

There is one UST site comprising three USTs listed within 1/8-mile of Marine Finance, which are presumably the three USTs formerly present at the Marine Finance site. The Vista Report lists the USTs as owned by REH, Inc., although the site was owned by West State, Inc. at the time of the tank closure and no other reference to REH, Inc. has been identified. The tank status of all three tanks is listed as closed.

The three USTs were removed and soil samples collected (Dames & Moore 1988). The soil confirmation samples collected from the UST excavations showed total petroleum hydrocarbon (TPH) concentrations below tanks 1 and 2, which each stored diesel fuel, of 5900 parts per million (ppm) and 2200 ppm respectively. The clean up standards in effect at the time were applied on a case-by-case basis and therefore a "clean up" criteria of 100 to 1,500 ppm TPH in the soils was suggested by the DEQ for the site. Contaminated soils were removed from the UST locations until TPH levels in the soil were acceptable to the DEQ. On 17 February 1989 DEQ issued a No Further Action Letter to West States, Inc. (PBSE, 1993).

The VISTA report also indicates that there are three sites within 1/8-mile, and another three sites within 1/4 - 1/2 mile of the Marine Finance site which are on the State Equivalent CERCLIS list (DEQs Environmental Cleanup Site Information (ECSI)). The three sites located within 1/4-1/2 mile: City of Portland Bureau of Environmental Services (BES) Water Pollution Control Laboratory, Mar Com Incorporated, and Crawford Street Corporation are located on the opposite side of the Lower Willamette River. The sites located within 1/8-mile of the site are Marine Finance Corporation, Transloader International Company, and the Doane Lake Study Area.

2.2.3 Historical Aerial Photographs

Historical aerial photographs were obtained from the Oregon Department of Transportation (ODOT) and the USACE (Appendix A). Photographs available from ODOT were taken in: 1958, 1966, 1971, 1981, and 1993. Photographs available from USACE were taken in: 1936, 1940, 1957, 1961, 1972, 1980, 1991, and 1998.

Logging operations adjacent to the site on the Willamette River are visible in the aerial photographs from 1936, 1940, 1957, 1958, 1961 and 1966. Scrap metal operations are visible east of the Quonset huts in the aerial photographs from 1972 and 1993 (Appendix A). The parcel to the northwest of the site was used as some type of storage in the 1980, 1981 and 1991 aerial photographs. Based on inspection of the aerial photographs, the following observations were made regarding changes to the Marine Finance site in addition to those reported in Section 2.2.1:

• In 1936, the rectangular building south of the bridge, which was used by Jacobsen Construction Company and later General Construction, was already present and the edge of the Willamette River was almost up to the railroad track. Logging operations were present on the water both south and north of the bridge. Various floating structures are present on the water.

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- In 1940, the edge of the Willamette River is significantly further away from the railroad track. It is difficult to tell if this change is solely due to a lower water level in the Willamette river, or to landfilling, or both. Logging operations and various floating structures are still present on the water.
- By 1957, numerous structures have been added to the site. These include the two Quonset
 huts and several smaller structures in the yard area. A large boat and two crane barges are
 present in the area south of the bridge. The 1958 and 1961 photos show much the same
 operations.
- In 1966, there are no boats or barges present in the area south of the bridge, but the area is occupied by floating logs. Some of the smaller structures in the yard area have been removed as well as the original rectangular building present in the 1936 photo (the warehouse used by Jacobsen Construction Company and General Construction). The warehouse was demolished in 1965 as noted in Section 2.2. There is also significant earth moving taking place in the yard area and along the shoreline.
- In 1971, virtually no water operations are present at the site. The foundation area of the former warehouse building is used as a storage area. The yard area is relatively clear other than a few piles of material north of the bridge, across from the north Quonset hut.
- By 1972, the site has significantly changed. The yard area has been leveled, the shoreline
 has been extended, and rip rap has been added for stabilization. Numerous piles of material
 are located throughout the yard area underneath and to the north of the bridge. The indented
 shoreline south of the bridge near the present-day Hendren Tow Boat has been straightened.
- In 1980, the yard area is clear again and there is a significant boat/barge operation south of the bridge. Also, the formerly unused area to the north of the Marine Finance site is used for material storage. There is a driveway directly between the two operations.
- In 1981, numerous boats and crane barges are present in the water, the yard area has some material storage, and the adjacent property to the north is still used as a storage area.
- By 1993, the site has several large barges and the yard area is used for storage. The adjacent property to the north does not appear to be occupied. The floating "island" operations used by Hendren Tow Boats is established.
- In 1998, numerous buildings have been added to the site in the yard area and along the water.

2.2.4 Site Reconnaissance

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John Zimmerman of Jacobs Engineering Group Inc. (Jacobs) performed a site reconnaissance at the Marine Finance site with Rodney Struck of DEQ on 22 March 2000. The following site information was noted:

- Limitations imposed by physical obstructions that may hinder field activities;
- Presence of overhead utilities;
- Evidence of past contaminant releases; and
- · Possible pathways for contaminant release and migration.

Jacobs/DEQ personnel met with Marine Finance representatives on Wednesday, 22 March 2000 to obtain information about past and current hazardous material handling practices and any knowledge they may have regarding past releases. Limited historic information was provided by Marine Finance personnel. During site reconnaissance, Jacobs/DEQ personnel were escorted by Marine Finance site property manager Mike Williams and site manager Darrel Andrews.

During the site reconnaissance visit the following general observations were made:

- A seep was observed in the northern portion of the site, near the former ferry landing. The seep emerges from the ground and creates a small area with standing water approximately 2 to 3 feet across. Discarded carboys, miscellaneous materials, and soil staining were noted in the area upgradient of the seep.
- A pipe was observed discharging water in the area near the former ferry landing. The pipe
 is believed to capture infiltrated water from the northern portion of the site as well as the
 property to the north of Marine Finance. Poor housekeeping and soil staining were noted in
 the area believed to be drained by this pipe. Historic material storage has occurred in the
 area as well.
- Surface soil staining was observed in several areas of the yard. The color of the staining ranged from dark gray to brown in areas from as little as 1 square foot up to 20 square feet. A stained area was also observed to the east of the north Quonset hut.
- Numerous apparently abandoned drums and other containers were observed in several
 collection areas on the property. The largest collections of containers were observed in the
 southern portion of the site. Some containers appeared to be leaking, but no labels
 identified the potential contents. Miscellaneous materials storage was noted near the
 southwest corner of the property outside of the security fence. This area has been identified
 as a popular dumping area (PBSE 1993).
- Surface markers for a buried petroleum pipeline were found adjacent and parallel to the
 access road west of the Burlington-Northern Railroad tracks outside of the property security
 fence. The pipeline is a high-pressure line buried 40-inches bgs and used for both gasoline
 and diesel fuels. It is owned by Olympia Pipeline Company of Renton, Washington. Leaks
 from this pipeline would be readily apparent because it is under high-pressure (PBSE 1993).

2.3 REGULATORY HISTORY

Four regulated actions associated with the site are known: (1) removal of the three USTs as discussed in Section 2.2; (2) one time disposal of abandoned paint waste; (3) a USCG spill report; and (4) a DEQ Strategy Recommendation. Information available for these activities includes:

- In 1988, the three USTs were decommissioned as discussed in Section 2.2.
- One time disposal of abandoned paint waste from a "dumping area" dated 20 March 1997 is reported, but the site's 1997 hazardous waste generator Annual Report indicates that the facility no longer generates hazardous waste (PBSE 2000).

- In a January 1998 spill report, the USCG observed numerous drums of oily rags, antifreeze, etc., with housekeeping and storage concerns at the Hendren Tow Boat site (PBSE 2000).
- DEQ issued a Strategy Recommendation on September 27, 1999. On January 25, 2000 DEQ issued a letter to Mr. Doug Watson of Astoria Metals Corporation giving notice of its intention to perform a PA at the Marine Finance site (PBSE 2000).

2.4 SITE TOPOGRAPHY

S. Comment

- 25

The Marine Finance site is located on the western bank of the Willamette River. The property is flat to gently sloping toward the river. An embankment with rip rap drops sharply to the water approximately 20 feet from the river edge. A gully is located in the northeast corner of the site. The offsite area to the west of the site slopes up steeply toward St. Helens Road and beyond to a small housing community west of the site. As noted in Section 2.2, fill material, rip rap, and land contouring have changed the original topography of the site, but all stormwater runoff has flowed and continues to flow toward the river. The actively used areas of the site have limited vegetative cover and mostly comprise road base materials. The offsite areas are well vegetated.

2.5 GEOLOGY AND HYDROGEOLOGY

The Marine Finance site is constructed on what is likely a combination of fill material and natural terrace deposits created by the Willamette River. Fill material has been noted to a depth of approximately 23 feet bgs in the area east of the Quonset huts (Dames & Moore 1988). The terrace deposits overlie alluvium of the Willamette River basin unconformably. Both of these deposits are of Pleistocene age and are composed of indistinguishable unconsolidated stratified sand and silt. The sand ranges from very coarse to very fine, but is predominantly fine to very fine (Trimble 1957). The thickness of the terrace deposits at the site is approximately 10 feet thick while the alluvium deposits are known to have a maximum thickness of 100 feet (Trimble 1957). Columbia River basalts are believed to underlie these alluvial deposits at various depths near the site. Lacustrine deposits consisting of unconsolidated boulders, gravels, sand, and silt with a thickness on the order of hundreds of feet lie beneath the alluvium deposits. The Pliocene Troutdale formation typically underlies the alluvial deposits in the region and consists of conglomerate, sandstone, shale, and mudstone. The thickness of the Troutdale formation ranges from zero to more than 1,100 feet.

Comparison of aerial photographs from 1938 and 1940 and from 1961 and 1972 indicates that a significant amount of fill material had been added to the site during both of these periods. As noted in Section 2.2, the USACE has no record of dredge material from the Willamette River being used as fill material onsite, indicating that the fill material was likely obtained from private dredging operations or another offsite source.

Based on static water levels reported in nearby monitoring wells and geotechnical holes, groundwater is expected to be encountered between 20 and 25 feet bgs (Oregon Water Resources Department 1999).

2.6 GROUNDWATER WELLS AND WATER USE

The Oregon Water Resources Department's GRID database was accessed to determine the locations of groundwater monitoring and water supply wells within the same Township, Range and Section as Marine Finance. Marine Finance is located in the east half of Section 11, Township 1N, Range 1W, but the search area included all of Section 11 (Appendix C).

Fifty-two wells were identified within the one square mile search area. Thirty-seven of the wells are listed as "geotechnical", 12 of the wells are listed as "monitoring", and 3 are listed as "water supply". Only 2 water supply wells are active because one well is listed as abandoned. Domestic well owners include (b) (6) [well address unavailable) and (b) (6) at (b) (6) which is located approximately (b) (6) of the site. Owners and the number of geotechnical and monitoring wells listed for each owner include: Mobil Oil (37), Time Oil (5), Olympic Pipeline (5), the City of Portland (2) and Wacker Siltronix. None of the wells are located downgradient of the site.

1.0 INTRODUCTION

This Expanded Preliminary Assessment (XPA) Report presents the results of the investigation performed at the Marine Finance site, Portland, Oregon, from 07 August through 10 August 2000 in accordance with the Preliminary Assessment (PA)/XPA Work Plan (XPA Work Plan) (Jacobs Engineering Group Inc. (Jacobs) 2000). The purpose of the XPA investigation was to determine whether hazardous substances have been or are threatened to be released at the Marine Finance facility and have been transported to the Willamette River sediments.

1.1 PURPOSE

A PA is required by Oregon state law at sites where a significant threat to human health or the environment is suspected from a release of hazardous substances (as defined in Oregon Revised Statutes (ORS) Chapter 465.200). Authority for conducting a PA is provided in ORS 465.245 and Oregon Administrative Rule (OAR) 340-122-072. A PA is designed to determine whether a site is releasing, has released, or could release hazardous substances to the environment and whether a response action is required. The objectives of a PA include identification of potential hazards at a site, identification of areas at a site that require immediate action, and establishment of priorities for areas on a site requiring further investigations. An XPA is considered necessary to determine if a release has occurred or may occur that could endanger human health or the environment.

This PA/XPA investigation was conducted under the Oregon Orphan Site Account for the Oregon Department of Environmental Quality (DEQ). The Orphan Site account was created to investigate and clean up hazardous substance contamination at high priority sites where the responsible party is unknown or is unwilling or unable to undertake the required removal or remedial actions (ORS 465.381). The Marine Finance site was designated an Orphan Site on 06 July 2000.

Seven exploratory probes were performed using direct push technology (DPT) techniques to collect five subsuface soil samples and seven groundwater samples for chemical analysis. Additionally, surface soil samples were collected at 11 locations, sediment samples were collected at six locations, and surface water samples were collected at two locations.

1.2 REPORT ORGANIZATION

The XPA Report has been organized into the following sections:

Section 1.0, Introduction, which includes information about the site, location, who performed the work, for whom the work was performed, and under what authority.

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Section 2.0, Background, which includes a brief description of the physical characteristics of the site and immediately adjacent areas, current and historical use, regional geology, and apparent problems at the site.

Section 3.0, Project Description, which summarizes the objectives of the sampling event, sampling criteria and rationale, and sampling procedures including any deviations to the work plan.

Section 4.0, Sampling Results, which includes tabulated data results and a brief narrative summary of all analytical data categorized by media and a summary of data quality and usability.

Section 5.0, Summary, which summarizes the results of the XPA investigation.

Section 6.0, References, which includes citations to all documents and information referenced in this report.

Appendices include:

- Appendix A, Comments to the Draft Report. This appendix presents the comments to the draft version of this document.
- Appendix B, Photographs. This appendix presents representative photographs of the work performed at the site.
- Appendix C, Field Forms. This appendix includes all field forms completed during the
 investigation, including sample collection forms, borehole logs, as well as copies of the
 field logbooks.
- Appendix D, Analytical Data Reports. This appendix includes all analytical data reports organized by media as well as the chains of custody and data verification reports.
- Appendix E, Comparison Criteria Sources. This appendix includes tables from which
 comparison criteria used in the text were obtained.

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2.0 BACKGROUND

The following sections provide a summary of the Marine Finance background, but a more comprehensive discussion and appendices with supporting documentation are included in the XPA Work Plan (Jacobs 2000).

2.1 SITE LOCATION AND DESCRIPTION

The Marine Finance site is located at 8444 NW St. Helens Road along the western edge of the Lower Willamette River adjacent to River Mile (RM) 6 in Portland, Oregon (Figure 2-1). The region around the site is characterized by heavy industry along the river and a mix of residential, commercial, industrial, and recreational properties west of St. Helens Road. Most development along the Willamette River has occurred within the area referred to as the Portland Harbor, within which the Marine Finance site is located. Portland Harbor has been dredged to provide a shipping channel generally 300 feet wide and 40 feet deep from RM 0 to RM 11.8 (Caldwell and Doyle 1995). The river is deep, slow moving, and tidally influenced near the site. Shoreline features include steeply sloped banks covered with riprap or constructed bulkheads, with man-made structures such as piers and wharves extending out over the water. Many portions of the riverbed are steeply sloped and maintain substrates composed mainly of silts and sands because of dredging activities (Farr and Ward 1991).

2.2 SITE OPERATIONS AND INDUSTRIAL OPERATIONS IN THE PROJECT AREA

The Marine Finance site is currently used for administrative functions, warehouses, tow boat operations, and light construction activities according to information provided by representatives from Marine Finance Corporation to DEQ on 22 March 1999. Structures at the site currently consist of two large metal-clad Quonset huts on concrete slabs, a wood-frame modular office building, a small metal-clad trailer house, a small wooden shed, a floating-home builder's dock, as well as a gangway and floating facilities owned by a tow boat company. A concrete slab foundation from a former warehouse building in the southern portion of the property still exists in part or in its entirety under some overlying soil. There are currently two docks onsite north of the St. John's Bridge. The site is currently occupied by five businesses which all lease space on a month-to-month basis:

- Transloader (Transversal) International Import/Export business. Transloader International
 occupies a trailer for its office operations and the south Quonset hut for warehousing of
 merchandise.
- Hendren Tow Boat Company Tugboat business. Hendren Tow Boat Company operates on Marine Finance property south of the St. John's Bridge. Since Hendren Tow Boat started operations at the site in 1993, it has been used as a tug boat dock. There are currently

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several floating structures/docks in the river adjacent to the site. Maintenance of its vessels is performed onsite.

- Mark Even Construction Houseboat construction. Mark Even Construction constructs
 houseboats on the shoreline of the Willamette River using a dock at the northern end of the
 property and has support operations and material storage in the adjacent area.
- Black Cat Studios Sculptors studio space in the northern end of the north Quonset hut.
- NW One Design Sailboat construction in the southern end of the north Quonset hut.

A 1993 Phase One Report, which was prepared by PBS Environmental as an environmental property assessment report, indicates that the property has been used by various marine construction companies and tow boat/barge companies since the 1920's or earlier (PBS Environmental (PBSE) 1993). In the past the site also had a modest warehouse in the southern portion of the site as well as smaller buildings, such as office buildings, a tavern, and a private residence. Between 1936 and 1940 the area was built up with fill material. The present day Quonset huts were constructed sometime before 1957. Much of the site was leased to two metal salvage companies from 1988 until 1993. The PBSE report indicated that scrap metal covered much of the storage yard and direct observation of the ground surface was difficult (PBSE 1993). Road base material was noted across most of the site during the present investigation.

In 1926, the south parcel was occupied by Jacobsen Construction Company, which performed pile driving, dock work, and bridge building. Jacobsen had an equipment warehouse with an office and tool room in the south end of the parcel, located between the river and the railroad tracks. This building was serviced with electric power, stove heat, and city water. Toilets and basins drained directly into the river. A dock and an overhead crane was located south of the warehouse. The adjacent property to the south was occupied by government moorings (PBSE 1993).

A cross-river ferry slip and landing was present through the 1920's on the north parcel near the present location of Mark Even Construction. The ferry apparently operated until approximately 1932 when the St. Johns bridge was constructed. A tavern, a private dwelling, and a garage were located just south of the bridge between the railroad tracks and St. Helens Road in 1932. Jacobsen continued to occupy the remainder of the south parcel. Houseboats occupied the shoreline on the north parcel.

By 1943, the south parcel was occupied by Portland Tug and Barge, which was owned by Jacobsen Construction. The equipment warehouse remained, and a new one-story office building was constructed on the north parcel and connected to the sewer.

By 1948, fill material had been placed on the north parcel bringing it to close to its present day elevation. The U.S. Army Corps of Engineers (USACE) has no records of fill disposal from

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river dredgings on the property, which indicates that the fill material was likely obtained from private dredging operations (PBSE 1993). A 1948 aerial photo shows two elongated buildings, which appear to be warehouses, side-by-side in the center of the north parcel (Jacobs 2000). In 1951, a temporary restroom connected to a septic tank was constructed on the property (PBSE 1993).

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General Construction Company purchased the property from Jacobsen Construction Company in approximately 1953. The address for Portland Tug & Barge (8444 N.W. St. Helens Road) was listed as vacant starting in 1953 until 1957. At approximately this time, the Corps of Engineers occupied the government mooring property to the south. The present-day Quonset huts (Figure 2-2) were constructed before 1957 based on review of the aerial maps although the PBSE report indicates construction in 1959 (PBSE 1993). The original warehouse on the south parcel was demolished in October of 1965.

In 1972, a permit was filed by General Construction Company with the City of Portland for the grading, surfacing, and fencing of storage areas, and construction of dolphins, floats, ramps, and an oil storage building for lubricants and greases. Precise locations are uncertain, but aerial photographs indicate that several ancillary structures were constructed on the east sides of both Quonset huts between 1971 and 1972. Additionally, much additional storage east of the Quonset huts and on the southern portion of the property is noted in 1972. Later that year, an office trailer was added on the north parcel. In 1979, a sewer connection permit was filed by General Construction for a trailer on the south parcel (PBSE 1993).

The property was purchased from General Construction in 1988 by West State, Inc. The buildings and property were leased in 1989 to Clydes Ferrous Metal Salvage whose office space was in the south half of the north Quonset hut, and Abrams Scrap Metal whose office space was in the south Quonset hut. Scrap metals were stored in the area east of the Quonset huts. A diving and construction company called Dutra Devine occupied the north end of the north Quonset hut and the modular office building near the north dock. Prior to Dutra Devine, the north end of the north Quonset hut was occupied by Western Boiler Repair.

Three underground storage tanks (UST) located immediately east of and adjacent to the southern Quonset hut (Figure 2-2), which were previously used by General Construction Company, were removed from the site in 1988 immediately after the purchase of the property by West State, Inc. (Dames & Moore 1988). Two USTs, a 20,000-gallon and a 10,000-gallon tank, stored diesel fuel and the third, a 5,000-gallon UST, contained gasoline. A fuel pumping island was located near the USTs by the southern Quonset hut. A fuel line also led to the dock north of the St. Johns Bridge and may have supplied fuel for river vessels and/or been a supply line for the USTs. Contaminated soil was excavated from the tank pits to depths of 15 to 26 feet below ground surface (bgs). Additional test pits were dug along the former route of the product lines,

and more contaminated soil was removed. The removal project received a "No Further Action" letter from the DEQ in February 1989.

2.3 PREVIOUS INVESTIGATIONS

The site is located adjacent to a 6-mile stretch of the Lower Willamette River between the upstream ends of Sauvie Island (RM 3.5) and Swan Island (RM 9.5) where the U.S. Environmental Protection Agency (USEPA) conducted a sediment study in 1997 (USEPA 1998). This study included collection of 187 near-shore sediment samples from either shallow (6 to 17 centimeters (cm)), or deep (55 to 139 cm) sediments. Most of the samples (150) were collected from the shallow horizon. All samples were analyzed for total metals, semivolatile organic compounds (SVOCs), total organic carbon (TOC), and sediment grain size. Selected samples were also analyzed for organotins (specifically tributyltin (TBT)), pesticides, polychlorinated biphenols (PCB), chlorinated herbicides, and chlorinated dioxins and dibenzofurans (DEQ 1999, USEPA 1998).

One of the subsurface sediment samples (SD055-C) was collected adjacent to the Marine Finance site from a depth of 0 to 90 cm. Another shallow sediment sample (SD055) was collected downstream, and both a shallow (SD057) and subsurface (SD057-C) sediment sample was collected upstream of the Marine Finance site. The results exceeding the Portland Harbor Sediment Baseline Maximum Value included copper, lead, mercury, nickel, zinc, 2-methylnaphthalene, benzoic acid, carbazole, dibenzofuran, total low molecular weight polycyclic aromatic hydrocarbons (LPAHs), total high molecular weight polycyclic aromatic hydrocarbons (HPAHs), and TOC (Table 2-1). The Marine Finance sample exceeded baseline values for 12 analytes, while the two upstream samples (SD057 and SD057-C) exceeded baseline values for two and four analytes, respectively. The downstream sample did not exceed the baseline values for any of the analytes (DEQ 1999). The two nearby upstream sites which are currently undergoing investigation are the U.S. Moorings Site, and the Gasco Site (DEQ 1999).

The Level One (Phase One) Environmental Property Assessment Report (PBSE 1993) found that various items stored in the yard presented potential sources of contamination, such as empty drums taken in as salvage which once contained hazardous material, as well as electrical transformers and metal shavings. The updated PBSE 2000 report stated that the bulk of the scrap metal in the yard had been removed, but that a large number of small pieces of plastic and metal were present within the surface soils of the former metal salvage storage yard.

Three USTs were removed from the facility in 1988 and soil samples collected (Dames & Moore 1988). The soil confirmation samples collected from the UST excavations showed total petroleum hydrocarbon (TPH) concentrations below tanks 1 and 2, which each stored diesel fuel, of 5,900 parts per million (ppm) and 2,200 ppm respectively. The clean up standards in effect at the time were applied on a case-by-case basis and therefore a "clean up" criteria of 100 to

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1,500 ppm TPH in the soils was suggested by the DEQ for the site. Contaminated soils were removed from the UST locations until TPH levels in the soil were acceptable to the DEQ. On 17 February 1989 DEQ issued a No Further Action Letter to West States, Inc. (PBSE, 1993).

2.4 REGIONAL GEOLOGY AND HYDROGEOLOGY

1. 4

The following discussion of the regional geologic setting is summarized from several published reports on the geology of the area, including Beeson et al., 1991, Madin 1990, Tolan and Beeson 1984, Allen 1975, and Waitt 1985.

The geology of the Portland area is characterized generally by a broad structural depression or basin bordered by the Cascade mountains on the east and the Coast Range mountains on the west. Geologic formations in the basin are also folded and dissected by a number of northwest-trending faults. The Tualatin mountains form a northwest-trending anticlinal ridge that is faulted along its eastern flank by the Portland Hills fault. The Willamette River flows along the base of the eastern side of the Tualatin Mountains. A number of additional faults are located approximately parallel or perpendicular to the Portland Hills fault and are mapped along or near the Tualatin mountains. An inferred graben is identified immediately southeast of the site (Beeson et al 1991).

A description of the geologic formations of regional significance that may be present at or near the site is presented below (from oldest to youngest):

- Columbia River Basalt Group The Portland basin is underlain by the Columbia River Basalt Group, which consists of flood basalt that erupted 17 to 6 million years ago. These Miocene-age flood basalts are characterized by a thick sequence of dense basalt flows that are separated by permeable interflow zones. These interflow zones are generally highly productive aquifers. This unit has been folded and faulted and forms the Tualatin Mountain uplands southwest of the site. The Columbia River Basalt Group dips steeply to the northeast near this area and is estimated to extend to a depth of 300 to 450 feet below (Madin 1990), with a thickness of more than 650 feet. Fluvial sediments of the Sandy River Mudstone and the Troutdale Formation overlie the Columbia River basalt flows.
- Sandy River Mudstone These deposits of Miocene to Pliocene age are friable to
 moderately indurated siltstone, sandstone, and claystone derived from an ancestral
 Columbia River that flowed into the Portland basin from the east. The deposits are found at
 thicknesses of up to 900 feet near Troutdale. However, outcrops of Sandy River Mudstone
 are not found near the Tualatin Mountains; the unit may pinch out or may have been scoured
 out in this part of the basin. The Sandy River Mudstone is overlain by the Troutdale
 Formation.
- Troutdale Formation The Troutdale Formation is of Miocene to Pliocene age and in this
 area, consists of interbedded conglomerates and finer-grained deposits (Beeson et al. 1991).
 The Troutdale Formation is characterized by pebbly to cobbly conglomerates consisting
 primarily of Columbia River basalt clasts with foreign clasts of volcanic, platonic, and
 metamorphic rocks, and interbeds of micaceous arkosic and vitric sandstone (Tolan and

Beeson 1984; Beeson et al. 1991). East of the Willamette River, outcrops of the Troutdale Formation are composed of locally derived pebbly to cobbly vitric sandstone with basalt clasts from Boring and Cascade lavas (Tolan and Beeson 1984). Major regional aquifers are established in the Troutdale Formation in much of the east Portland area. The thickness of the Troutdale Formation ranges from 900 feet near Troutdale to 200 to 300 feet in the western parts of the basin near the Tualatin Mountains (Beeson et al. 1991).

- Boring Formation During Pliocene-Pleistocene time, volcanic lavas were erupted from approximately 90 vents throughout the Portland and Vancouver area. Where present, these volcanic deposits overlie the Troutdale Formation (Allen 1975). Boring lava thicknesses are greatest near source vents; however, thicknesses rapidly decrease and pinch out away from source vent areas.
- Catastrophic Flood Deposits During the Pleistocene time, thick deposits of boulders, gravels, sands, and silts accumulated throughout the Portland basin as a result of the repeated failures of glacial ice dams that impounded glacial Lake Missoula (Waitt 1985). These catastrophic flood deposits form the terrace surfaces in the eastern Portland area and are composed of three different facies. Coarse-grained pebble to boulder gravels and sand make up the core of these terraces, with fine grained sand and silt deposits mantling the coarser-grained facies. A finer-grained, interlayers silt, sand, and gravel facies is found adjacent to the Columbia and Willamette River channels. The coarse-grained facies reach maximum thicknesses of 100- to 130 feet. The channel facies typically range in thickness from 15 to 45 feet (Beeson et al. 1991).
- Recent Alluvium Recent alluvium consists of Quaternary deposits or river sands, silts, and
 gravels deposited by the Willamette and Columbia rivers. These deposits are generally
 limited to the channel bottoms and floodplains of these rivers, and reach maximum
 thicknesses of about 150 feet (Beeson et al. 1991).

In addition to these geologic formations, imported sand fill is common along many of the floodplain terraces adjacent to the Willamette and Columbia rivers. The source of this fill is primarily dredged material from the shipping channels in these two waterways.

The Marine Finance site is constructed on what is likely a combination of fill material and natural terrace deposits created by the Willamette River. Fill material has been noted to a depth of approximately 23 feet bgs in the area east of the Quonset huts (Dames & Moore 1988). Fill material was presumed during the XPA investigation ranging from ground surface to approximately 18 to 23 feet bgs. Wood chips were noted in at least two boreholes at the change in lithology between presumed fill and native material (Appendix C).

The terrace deposits overlie alluvium of the Willamette River basin unconformably. Both of these deposits are of Pleistocene age and are composed of indistinguishable unconsolidated stratified sand and silt. The sand ranges from very coarse to very fine, but is predominantly fine to very fine (Trimble 1957). The thickness of the terrace deposits at the site is approximately 10 feet thick while the alluvium deposits are known to have a maximum thickness of 100 feet (Trimble 1957). Columbia River basalts are believed to underlie these alluvial deposits at various depths near the site. Lacustrine deposits consisting of unconsolidated boulders, gravels,

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sand, and silt with a thickness on the order of hundreds of feet lie beneath the alluvium deposits. The Pliocene Troutdale formation typically underlies the alluvial deposits in the region and consists of conglomerate, sandstone, shale, and mudstone. The thickness of the Troutdale formation ranges from zero to more than 1,100 feet.

Comparison of aerial photographs from 1938 and 1940 and from 1961 and 1972 indicates that a significant amount of fill material had been added to the site during both of these periods (Jacobs 2000).

Groundwater is approximately 16 feet bgs based on static water levels reported in nearby monitoring wells, geotechnical holes, and groundwater levels in the temporary well points installed during this XPA investigation. The hydraulic gradient presumably is toward the river based on the approximate water levels.

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3.0 PROJECT DESCRIPTION

3.1 SAMPLING OBJECTIVES, RATIONALE, AND LOCATIONS

A PA is required at sites where a significant threat to human health or the environment is suspected from a release of hazardous substances. An XPA is considered necessary to determine if a release has occurred or may occur and whether a response action is required (ORS 465.200 and OAR 340-122-072). An XPA is not, however, intended to be a full investigation or characterization of the site.

The purpose of this investigation was to provide a screening level evaluation of various media at the site. The sampling objectives were to collect samples from locations that have the greatest potential to be impacted by contaminants of interest to determine whether hazardous substances have been released or are threaten to be released and may have been transported to Willamette River sediments. Activities therefore included collection and analysis of environmental samples from soil, groundwater, surface water, and sediment from locations placed using best professional judgment in the field to select the optimal sampling locations based on proposed sampling locations and the rationale as discussed below.

Based on historical data reviewed in Section 2.3, contaminants or potential concern at the site include petroleum, oils, and lubricants (POL), paints/antifoulant biocide paints, stains, solvents, herbicides, PCB, and metals.

Samples were collected from the groundwater, surface soil (0 - 6-inches bgs), subsurface soil, surface water, and sediment (Figure 3-1) in accordance with the work plan (Jacobs 2000). The rationale for each sample location is described below.

DPT Locations

The following DPT borehole locations are depicted on Figure 3-1. Subsurface soil samples ("SB" designated locations) and groundwater samples ("GW" designated locations) were collected from the same borehole location. Groundwater samples GW-6 and GW-7, however, did not have soil samples collected, which is in accordance with the work plan (Jacobs 2000).

- SB-1/GW-1: Located south of the St. Johns Bridge in an active drum storage area. Additionally, the northern end of the former warehouse was present in this area and the foundation was used to store unknown materials.
- SB-2/GW-2: Located in the southern portion of the site where the former warehouse was located. The foundation was used to store unknown materials.
- SB-3/GW-3: Located on the east side of the southern-most Quonset hut (the Transversal International building) near the bay door and south of the trailer. A former 5,000-gallon UST that stored gasoline and a former 10,000-gallon UST that stored diesel were removed

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from this area in 1988. Historic use of the Quonset hut is unknown, but releases or disposal of any hazardous substances used would likely contaminate soils immediately adjacent to the bay door.

- SB-4/GW-4: Located east of the southern-most Quonset hut (the Transversal International building). A former 20,000-gallon UST that reportedly contained diesel was removed from this area in 1988 and a fuel pipeline that transported fuel between the UST and the dock also is located in this area.
- SB-5/GW-5: Located near the dock east of the Marine Finance office trailer. A fuel pipeline transferred petroleum from the USTs near the office trailer area to the dock area to fuel river vessels and likely was also used to transfer fuel from river tankers to the site USTs. Additionally, this location is downgradient of the former scrap metal storage area.
- GW-6: Located south of the Transversal International Corporation Trailer and away from
 the shore line enough to prevent influence from the river. This area is downgradient of the
 Quonset huts and other potential contamination sources, including a former scrap metal and
 material storage area.
- GW-7: Located approximately half way between the St. Johns Bridge and the Hendren Tow Boat Dock and away from the shore line enough to prevent influence from the river. As with GW-6, this area is downgradient of potential contamination sources and is located at a potential material storage area.

Surface Soil Locations

The following surface soil sample locations, which are each designated with an "SS" label, are depicted on Figure 3-1.

- SS-1: Located south of the St. Johns Bridge in an active drum storage area near the location of SB-1. Additionally, the northern end of the former warehouse was present in this area and the foundation was later used to store unknown materials.
- SS-2: Located south of the St. Johns Bridge further south of SS-1 in another drum storage area. Additionally, the southern end of the former warehouse was present in this area and the foundation was later used to store unknown materials.
- SS-3: Located east of the Marine Finance office trailer south of the dock in an area where an oil stain was noted during the site visit and where scrap metal was historically stored.
- SS-4: Located west of the dock in the area where scrap metal was historically stored.
- SS-5: Located east of the Transversal International building (southern-most Quonset hut) adjacent to the bay door. Poor housekeeping, miscellaneous debris, and staining were noted during the site visit. Additionally, waste material and past releases from the Quonset hut may have been discharged (e.g. swept out the door or discarded).
- SS-6: Located on the east side of Blackcat Studios and the N.W. One Design. Soil staining and drums were noted during the site visit.
- SS-7: Located in the northern portion of the site near an area where carboy containers were discarded. The content of the carboys is unknown and historic contents that may have been released are unknown.

- SS-8: Located outside of the perimeter fence along the access road in the southern portion
 of the site where the Oregon Department of Transportation (ODOT) has material stored.
 The site has been noted as an unauthorized dumping area (PBSE 1993) and public access is
 not restricted in this area.
- SS-9: Located in the general area of the Mark Even Construction dock. A discretionary riverbank sample was collected near a general materials staging area adjacent to the dock as indicated in a photograph in Appendix B.
- SS-10: This discretionary riverbank sample was collected in the southern portion of the property in an area denuded of vegetation.
- SS-11: Located south of the St. Johns Bridge adjacent to the Willamette River. A discretionary riverbank sample was collected near a toppled drum, which was labeled "Resin" and flammable liquid, and contained a presumed lead-acid battery (photograph in Appendix B).

Surface Water and Sediment Locations

The following surface water and sediment sample locations are depicted on Figure 3-1. Surface water sample locations are designated with "SW" labels and sediment sample locations are designated with "SD" labels.

- SD-1/SW-1: Located in the seep pool in the northern portion of the site northwest of Mark Even Construction. Both a surface water and sediment sample were collected from the seep to determine if potential contaminants from the upgradient areas are being transported to the seep and potentially to the Willamette River. As indicated in Section 3.0, general disposal, including carboys, was noted in the upgradient areas.
- SD-2: Located northwest and downstream of the Mark Even Construction dock (north dock) in an area where runoff from the site would accumulate.
- SD-3: Located north and downstream of the middle dock which was in use during the XPA investigation. Historic operations at the middle dock are unknown, but the upgradient area was used for scrap metal storage and an abandoned fuel line terminated adjacent to the dock.
- SD-4: Located north and downstream of the Hendren Tow Boat operations. Historic use of the dock is uncertain, but upgradient land use currently includes drum storage. The former warehouse was located upgradient and its foundation was later used to store materials.
- SD-5: Located north of, in the center of, and downstream of the Hendren Tow Boat operations.
- SD-6: Located approximately 100 feet upstream of the Hendren Tow Boat operations as a baseline sample for the Marine Finance site.

3.2 SAMPLING METHODS AND ANALYTICAL REQUIREMENTS

3.2.1 SAMPLING METHODS

Surface Soil Sampling

Surface coverings, such as vegetation, debris, rocks, and obvious contamination (e.g. stained soil) were removed using hand trowels or picks to remove the hard packed road-base material. Volatile organic compound (VOC) samples were collected immediately to minimize the loss of volatiles using EnCore[®] sampling devices in accordance with SW5035 extraction and preservation methods. The surface soil interval, which was from the ground surface to approximately 6-inches bgs, was selected based on the area closest to the surface in which a sample could be collected without significant interference from vegetation, debris, rocks, and obvious contamination. Vegetation, debris, and rocks were removed from the sample aliquot to the extent practicable. Samples, other than VOCs, were collected with decontaminated stainless steel spoons and transferred a stainless steel mixing bowl for homogenization and subsequent transfer to sample containers.

Composite samples were collected from locations SS-3, SS-4, and SS-6 as indicated in the XPA Work Plan (Jacobs 2000). The sample aliquot was homogenized in a stainless steel mixing bowl and then transferred to the sample containers. The samples for VOC analysis, however, were collected as grab samples using an EnCore[®] sampler from a single point to minimize loss of volatiles.

Subsurface Soil Sampling

The subsurface soil samples were collected by driving a 2-inch diameter (macro core), 4-foot long, push probe sampler equipped with a polyvinyl chloride (PVC) liner. The pin attaching the sampler's tip was released allowing the tip to slide up inside the sampler when the top of the sample interval was reached. The sampler was then driven another 4 feet to collect a soil core. Vapor measurements were made on the soil using a photoionization detector (PID) equipped with a 10.6 electron-volt (eV) probe to screen for VOCs. Sample cores were collected continuously for lithologic logging purposes using the Unified Soil Classification System (USCS) (USACE 1953), which is reported in Section 4.0, and for screening of the entire bore for evidence of contamination (i.e. PID screening and observation of olfactory and visual indications).

The soil core interval with the highest PID reading or the most contaminated interval based on visual, olfactory, and/or best professional judgment was then collected in appropriate sample containers for submission for analytical testing as indicated in Table 3-1. The rationale for collection of soil from a specific interval follows:

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- SB-1: Collected from the 6-8 foot bgs interval because of a PID reading of 0.7 ppm. No staining or odor was noted, however, in this interval or in any interval at SB-1.
- SB-2: Collected directly above the groundwater table at 14-16 feet bgs because no PID reading above 0 ppm were noted at any interval within the borehole nor was any staining or odor noted. The interval directly above the groundwater was therefore selected to determine any soil contamination closest to the groundwater for potential leaching.
- SB-3: Also collected directly above the groundwater table at 18-20 feet bgs for the same reasons as SB-2.
- SB-4: Also collected directly above the groundwater table at 20-21 feet bgs for the same reasons as SB-2 and SB-3.
- SB-5: Collected at 18-18.5 feet bgs because of a PID reading of 1.8 ppm. PID readings above 0 ppm started at 11 feet bgs and continued to 18.5 feet bgs ranging from 0.2 ppm to 1.8 ppm. No staining or odor was noted, however, in this interval or any interval at SB-5. This deeper interval was also selected because it was closest to the groundwater.

Groundwater Sampling

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Groundwater grab samples were collected upon completion of the DPT probe to approximately 3 feet below the water surface and re-fitted with a temporary well point. However, some boreholes were driven several additional feet when water recovery was inadequate. Polyethylene tubing was attached to the well point and threaded through the drill string during advancement. After reaching the total depth, the well point was driven an additional 2 feet into native soil.

Temporary well points were purged of three hole volumes using a vacuum pump prior to sampling as appropriate. However, poor water recovery prevented purging of 3 volumes at all locations. After purging, groundwater samples were collected using the same methodology used for purging except that VOCs were collected using a hand-operated inertia pump.

Surface Sediment Sampling

Subtidal surface sediment samples were collected using a stainless steel 0.1 square meter (m²) van Veen grab sampler suspended from the stern of a 30-foot aluminum hull boat in accordance with the XPA Work Plan (Jacobs 2000). A single grab generally produced sufficient volume for the required analyses, although several attempts were required to obtain any sample aliquot. It was surmised based on the field crew professional experience that most of the locations had riprap and other debris that often prevented sediment recovery. Personnel from the Mark Even Construction Company confirmed this based on their dives in the area. Penetration depths ranged from 0 cm to approximately 20 cm.

Accepted samples were placed in a stainless steel bowl for homogenization and then transferred to sample containers using a stainless steel spoon. Observations of sediment composition were made and recorded on sample collection forms (Appendix C).

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Subsurface Sediment Sampling

The subsurface sediment samples were collected using a 2-inch diameter gravity corer configured with a 3-foot barrel and a 150-pound weight stand. Up to 12 attempts were made at each location to obtain any penetration. As stated above, most locations had riprap and submarine survey of the channel in the sample locations indicated a relatively steep slope. The nosecone was deformed on several occasions as indicated in a photograph in Appendix B. Therefore, it was surmised that the gravity corer was bouncing off of the rip rap and/or deflecting off of rip rap or debris on the channel slope. Core recovery varied throughout the study area from several inches to 2-feet. A summary of gravity core recovery is listed in Table 3-2. The gravity corer was initially dropped (free-fall) at approximately 4 feet above the sediment at each location and then dropped from higher elevations to obtain adequate sample recovery. Core collection observations were recorded on the sample collection forms and in the field logbooks (Appendix C).

Sediment from each core liner was extruded into a decontaminated stainless steel bowl by tipping the liner and tapping the liner as necessary. Observations of the sediment were noted both through the clear liner and upon extrusion. The sample was then homogenized in the bowl and transferred directly to sample containers.

Surface Water Sampling

The surface water samples were collected of surface water discharge from the water body (the seep) or flow (stand-pipe) in a Teflon beaker. The aliquot were collected in a reasonable manner that reduced aeration of the water to minimize offgassing of volatile organics. The aliquot was immediately transferred directly to the sample containers.

3.2.2 ANALYTICAL REQUIREMENTS

All samples were analyzed in accordance with the methods and procedures specified in the XPA Work Plan (Jacobs 2000). Chemical analyses performed are listed in the data review, Section 4.0.

Duplicate samples were collected at a rate of one in 20 for each matrix except groundwater, which were considered screening level data because of the collection methods. Matrix spike/matrix spike duplicates (MS/MSD) were also collected at a rate of one in 20 for each matrix except groundwater. Trip blanks were included in every cooler containing any volatile organic analysis (VOA) samples and temperature blanks were included in every cooler.

3.3 SAMPLE HANDLING, PACKAGING, AND SHIPPING

Samples were handled, packaged, and shipped in accordance with the XPA Work Plan (Jacobs 2000). All shipments were picked up by a laboratory courier the morning after sample

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collection with the exception of a sample shipment delivered by the field crew on a Saturday when no courier was available.

3.4 DOCUMENTATION

All field documentation, sample designation and labeling, and chain of custody procedures specified in the XPA Work Plan were followed. All documentation is presented in the attached appendices.

3.5 EQUIPMENT DECONTAMINATION AND INVESTIGATION-DERIVED WASTE

Decontamination procedures and investigation-derived waste (IDW) containment and storage specified in the XPA Work Plan were followed. One 55-gallon steel open-top drum with approximately 20 gallons of decontamination and purge water was stored immediately north and adjacent to the middle dock. This drum was labeled with a non-hazardous waste sticker and the accumulation start date, contact organization (DEQ) and phone number, type/source of waste, and the quantity.

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4.0 SAMPLING RESULTS

The following sections present analytical data generated during the XPA investigation. The photographs, field sampling forms and logbook copies, and the data analytical results, which includes the chains of custody, and data verification reports are included in Appendices B through D, respectively.

4.1 DATA PRESENTATION

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Analytical data tables reporting all results exceeding the reporting limits (RL) for surface soil, subsurface soil, groundwater, surface water, and sediment samples are presented by contaminant category and media in Tables 4-1 through 4-14. Appendix D includes all data results for the samples as well as for the quality control (QC)/quality assurance (QA) samples. The raw data reports have been submitted to DEQ separately.

4.1.1 SUBSURFACE SOIL LITHOLOGY

The boring logs describing the soil composition consistent with the USCS are included in Appendix C. In summary, most of the site is covered with approximately 12- to 18-inches of roadbase material that is tightly compacted underlain by what is suspected to be fill material to approximately the top of the water table. Native soil then underlies this fill material.

Most of the site within the perimeter security fence is covered with a roadbase material with limited vegetation other than along the edge of the riprap, around the Quonset huts, and at the northern and southern ends of the property. An employee of Mark Even Construction noted that the Willamette River flooded in 1996 and deposited up to 3 inches of sediments across the site up to the Quonset huts. Sediment was not obvious on the roadbase, but likely was cleared from the site, eroded, and/or mixed with the roadbase material.

Fill material across the site is presumed from examination of the historic aerial photographs as addressed in the XPA work plan (Jacobs 2000). Several boring logs indicate this presumed fill material to approximately the groundwater table, which is consistent with the aerial photographs. Additionally, two locations, SB-3 and SB-4, indicated wood chips at the bottom of the presumed fill material which may have been debris from past logging operations before the fill material was emplaced. The fill material was consistent in the borings and described as a fine- to medium-sand with trace silt, poorly graded, brownish-gray, and often dense. Brick fragments were noted in the presumed fill material at SB-3.

Much of the site closest to the present shoreline was formerly at or under the water line before the fill material was emplaced. The presumed native soil was generally described in the boring

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logs as a fine, dark gray sand. Several silt lenses, or sandy silts, several inches thick were noted at various depths in most boreholes.

4.1.2 FIELD OBSERVATIONS

Several qualitative observations were noted while performing the XPA investigation as noted below, reflected in the field documentation (Appendix C), and often shown in photographs in Appendix B.

Soils

Surface soil samples were collected from former and present drum storage areas and areas of present and presumed former material storage areas (photographs, Appendix B). Workers at the Marine Finance site were noted moving drums near the southern portion of the site during the XPA investigation activities, although the contents of these drums were unknown. It was surmised by the field crew that the drums were likely empty from observations of the workers easily moving drums by hand and that the activities were simply part of site maintenance.

Oil stains were noted in the surface soils at locations SS-3 and SS-6. Surface soil samples were collected from the intervals under the stained soils to determine petroleum constituents that may be leaching to the underlying soils from the stains.

Locations SS-3 and SS-4 were composite samples collected from areas of former scrap steel storage. While no large pieces of scrap remained, several small pieces of steel generally measuring less than a inch on any axis were noted in the area of SS-4.

Material and supply storage was noted adjacent to the dock near the Transversal International trailer and Mark Even Construction (photograph, Appendix B). It is likely that this area has historically been used for storage adjacent to the dock. Material stored during the XPA investigation was noted to be primarily scrap wood.

A denuded area was noted on the southern portion of the site during a site visit by representatives from DEQ on 10 August 2000. A sample of opportunity, SS-10, was collected from this location within the area void of vegetation.

An empty drum labeled "Resin" and flammable liquid with a presumed lead-acid battery was found on its side at location SS-11 (photograph, Appendix B). A surface soil sample was collected immediately adjacent to the drum and battery.

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Surface Water and Sediments

Recovery of sediment was difficult at most locations both for samples collected using the van Veen sampler and the gravity corer. Proper functioning of the dredge sampler was ensured and often captured debris, but little sediment. Occasionally, a piece of debris such as wood chips or a small piece of riprap would prevent the jaws of the dredge from fully closing and hence any sediment was washed out upon retrieval. Gravity coring was also problematic. Submarine surveying of the channel indicated that the channel was steep and likely covered with riprap. An employee from Mark Even Construction indicated that he had dived in the area and that the area was covered with debris and riprap. Therefore, it is surmised that the steep channel bank, debris, and riprap interfered with both the dredge and the gravity corer. The nose cone of the gravity corer was badly misshapen presumably from hitting the riprap (photograph, Appendix B).

Location SD-2 near Mark Even Construction was relocated closer to the channel because several attempts failed to produce any recovery at the original location. An employee with Mark Even Construction indicated that an office building was formerly located adjacent to the shore at the northern boundary of the property but was demolished and the debris pushed into the area of the original SD-2 location. Dredging with the van Veen sampler only recovered wood chips in the original SD-2 location consistent with building debris; the wood chips also may have been from houseboat construction in the vicinity by Mark Even Construction and/or other former tenants.

Several sample collection attempts were also made at SD-3. Wood chips were repeatedly captured by the dredge, although little if any sediment was captured.

Sample collection at SD-5, which located immediately downgradient of Hendren Towboat near the bridge footer, was attempted several times both with the dredge and the gravity corer. An initial dredge attempt captured a gelatinous, silica-type material that was approximately an inch thick and approximately 4 inches by 6 inches. The material was translucent, could be easily ripped, and seemed to have been torn from a larger piece. No odor was noted. A photograph is included in Appendix B.

Additional sample recovery attempts at SD-5 produced a sheen on the surface water. The dredge sample aliquot had a sheen on the sediment and a sheen was also noted during decontamination of the dredge. The gravity core sample also produced a sheen when the aliquot was emptied into a mixing bowl and also produced a sheen on the surface water upon retrieval; the sample headspace reported 4.5 ppm measured by the PID. However, several other previous attempts with both the dredge and the gravity corer were made in a 30-foot by 20-foot area with no indication of a sheen. One of the previous gravity core attempts captured a bolt in this area (photograph, Appendix B) and wood chips were often captured by the dredge in this area.

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The seep, which is location SD/SW-1, was noted to have various debris, including a rusted steel cable, wood, PVC or plastic pieces, aluminum foil, and a piece of electrical wire. However, it was also noted that several water bugs were living in the seep.

No rainfall events occurred during the XPA investigation, so no surface water runoff samples of opportunity were collected.

Groundwater

Few notable observations were made concerning the groundwater. However, a sheen was noted while collecting water quality parameters at location GW-3, which is the location east of the southern Quonset hut near former gasoline and diesel USTs and a former fuel distribution island.

4.2 DATA EVALUATION

This data evaluation includes assessment of (1) whether contamination was detected; and (2) whether the concentrations are above background values, if available, and/or are above risk-based criteria (RBCs) or other criteria as presented in Table 4-15 through Table 4-17. The criteria presented in these tables are only for the contaminants detected above the RL. Appendix E contains the sources of the values used in Table 4-15 through Table 4-17.

Inorganic compounds (metals) reported in soils are compared to background soil concentrations for Clark County, Washington (Table 4-15). The metals and the organic compounds reported in soils are then compared to USEPA Region 9 preliminary remediation goals (PRGs) for industrial-use soil, if available. Analytical results from sediment samples are compared to Portland Harbor Apparent Baseline Values (Table 4-17) (USEPA 1998). Groundwater analytical results are compared to USEPA Region 9 PRGs for tap water, if available, and then to DEQ Water Quality Standards (OAR Division 41 – Table 20). If no water quality standard is available, the groundwater is compared to Level II Screening Benchmark Values for ecological risk protective of fresh water aquatic species (Table 4-16). Surface water is compared to DEQ Water Quality Standards (OAR Division 41 – Table 20). If no water quality standard is available, the surface water is compared to Level II Screening Benchmark Values for ecological risk protective of fresh water aquatic species (Table 4-16). RBCs are not available for TPH in soil, sediment, or water. Therefore, the TPH concentrations are reported but are not evaluated against criteria.

No background samples were collected at the site. The only known background values available are for metals in soils for Clark County, Washington as presented in Table 4-15. Sediment samples were collected both from shallow and deep sediments in the Willamette River immediately upstream of the Marine Finance Site. The sediment samples collected adjacent to the site are compared to the results from these upstream samples as well as against baseline

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values from the Portland Harbor Sediment Investigation Report (USEPA 1998), although these baseline values are not necessarily representative of background values for the river.

4.3 QUALITY CONTROL SUMMARY

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Laboratory results were verified as 100 percent complete and all samples submitted for analysis had acceptable results provided. With the exception of one PCB repreparation and reanalysis in subsurface soil sample "PHSS-6", all samples were extracted and analyzed within USEPA required holding times. The initial PCB extraction and analysis for sample PHSS-6 was performed within recommended holding times. The surrogate standard result was outside laboratory and USEPA method control limits. Sample reextraction occurred one day beyond the USEPA recommended 14-day holding time. No PCB compounds were detected in the initial or reextracted sample analyses.

The data result tables (Tables 4-1 through 4-14 and all-tables in Appendix D) were compiled from hard copy data deliverables provided from chemical analyses conducted by the Columbia Analytical Services laboratory in Kelso, Washington. Laboratory data reports submitted to Jacobs were complied using the laboratory's contracted statement of work and Oregon DEQ data requirements. Raw data were collected and are available at the laboratory, but were not included or requested for any of the data reports submitted.

The data quality is consistent with legally defensible definitive (not screening level quality) data and can be evaluated for the data assessment elements of precision, accuracy, representativeness, comparability, and completeness (PARCC). Precision was not thoroughly evaluated because raw data was not requested. The laboratory was required to perform analyses using contractor, method, and laboratory specified control limits. Precision for laboratory analytical data was measured by evaluating the relative percent difference (RPD) from MS/MSD and/or laboratory control sample/laboratory control sample duplicate (LCS/LCSD) sample pairs. Where applicable, precision for MS/MSD and/or LCS/LCSD was evaluated specific to preparation batches within the sample delivery groups (SDGs).

Similarly, accuracy was not thoroughly evaluated because raw data was not requested. Accuracy for laboratory analytical data is measured by statistically evaluating the values determined from numerous QC samples. The responses evaluated are initial multi-point calibrations (ICAL) percent relative standard deviation (% RSD); continuing calibrations (CCAL) percent difference (% D) from the ICAL; the frequency and percent recovery (% R) of CCAL samples; and the % R of the LCS, LCSD, and surrogate standard (SS) samples. Also evaluated were the specific calibration response factors and retention times for each SVOC and VOC target and surrogate compound; the SVOC and VOC "tuning" compound responses; and any contamination found in the various kinds of blank samples. The laboratory monitored this element as demonstrated by the reextraction and reanalysis of PCB sample PHSS-6.

Representativeness was evaluated through examination of the chain of custody (COC) forms, and verification that the requested analyses were performed according to documented methods. COC was maintained for all samples, including satisfactory preservation and analysis within required holding times. Samples were acquired in accordance with the project-specific sampling and analysis plan (SAP) (Jacobs 2000). Samples were, therefore, representative of the three-dimensional locale stated in the SAP.

Comparability was evaluated through verification that standard USEPA or other documented methods were utilized and that project documentation was consistent. Comparability for this data was acceptable based on the use of standard methods and project consistent documentation.

Completeness was evaluated numerically by comparing the number of usable analytical results to the total number of analyses performed. All sample aliquots were collected, shipped for analysis, analyzed by the requested method, and reported with satisfactory quality control results. No sample results were unacceptable; thus, completeness was 100%.

4.4 ANALYTICAL RESULTS

The analytical results above the RL for all samples collected from all media at Marine Finance are presented in Tables 4-1 through 4-14 and all data are presented in Appendix D. Copies of the raw data have been provided to DEQ separately.

- Table 4-1, Total Petroleum Hydrocarbon Hits Soils
- Table 4-2, Volatile Organic Compound Hits Soils
- Table 4-3, Semi-Volatile Organic Compound Hits Soils
- Table 4-4, Metal Hits Soils
- Table 4-5, Tri-Butyltin Hits Soils
- Table 4-6, Volatile Organic Compound Hits Water
- Table 4-7, Semi-Volatile Organic Compound Hits Water
- Table 4-8, Metal Hits Water
- Table 4-9, Total Petroleum Hydrocarbon Hits Sediment
- Table 4-10, Semi-Volatile Organic Compound Hits Sediment
- Table 4-11, Metal Hits Sediment
- Table 4-12, Tri-Butyltin Hits Sediment
- Table 4-13, Polychlorinated Biphenyl Hits Sediment
- Table 4-14, Total Organic Carbon Sediment

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The data are also presented by media on the site maps in Figures 4-1 through 4-5. The data presented on the figures presents a summary of the data as follows:

- TPH the TPH values include the sum of gasoline range organics (GRO), if requested for analysis, diesel range organics (DRO), and residual range organics (RRO).
- VOC the VOC values include the sum of all VOCs reported above the RL.
- SVOC the SVOC values include the sum of all SVOCs reported above the RL.
- TBT the TBT values include the sum of the n-butyltin analogs reported above the RL, including tert-n-butyltin, tri-n-butyltin cation, di-n-butyltin cation, and n-butyltin cation.
- PCB the PCB values include the sum of all PCBs reported above the RL, including Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 1260.
- Metals all metals detected above the RL could not be effectively represented on the figures. Instead, the figures indicate whether all metals were detected less than background or criteria values or any metal exceeded the background or criteria values.

The following data review presents the results exceeding the RL and compares the results to the criteria in Tables 4-15 through 4-17 as discussed in Section 4.2.

4.4.1 SURFACE SOIL

The analytical results for all surface soil locations are presented in Tables 4-1 through 4-5 and are depicted graphically on the site map in Figure 4-1.

TPH

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DRO was detected above the RL in 7 of the 8 surface soil samples collected ranging from 28 milligrams (mg)/kilogram (kg) at location SS-5 to 1,400 mg/kg at location SS-6 (Table 4-1). RRO was detected above the RL in 6 of the 8 locations ranging from 110 mg/kg in both SS-4 and SS-5 up to 9,800 mg/kg again at location SS-6. TPH, which sums DRO and RRO, ranged from 35 mg/kg at SS-1 to 11,200 mg/kg at SS-6.

Sample location SS-1, which is near a drum storage area (Figure 4-1), reported only DRO at 35 mg/kg. The adjacent drum storage area, SS-2, reports DRO at 84 mg/kg and RRO at 250 mg/kg. Samples collected near the former metal storage area, SS-3 and SS-4 reported similar TPH concentrations (490 mg/kg and 330 mg/kg, respectively). The surface soil samples collected near the two Quonset huts, SS-5 and SS-6, reported TPH results that had two order of magnitude difference (138 mg/kg and 11,200 mg/kg, respectively). SS-6 was a composite sample near the northern Quonset hut collected under stained soil with a petroleum odor.

VOC was not detected above the RL at SS-1, SS-2, SS-7, SS-8, or SS-10 (Table 4-2). The only VOCs detected above the RL were (1) acetone at 66 micrograms (μ g)/kg at SS-6, which was collected under stained soil adjacent to the northern Quonset hut, while the USEPA Region 9 PRG for acetone in industrial soil is 6,200,000 μ g/kg; and (2) trichlorofluoromethane at 10 μ g/kg at SS-9, while the PRG for trichlorofluoromethane in industrial soil is 2,000,000 μ g/kg (Table 4-15).

SVOC

Several polycyclic (or polynuclear) aromatic hydrocarbon (PAH) compounds were detected in 6 of the 10 surface soil samples analyzed for SVOC (Table 4-3). Benzo(a)pyrene, which is typically a risk driver and has a PRG for industrial soil of 290 μ g/kg (Table 4-15), was reported in samples from 3 locations, including SS-2 near the drum storage area at 910 μ g/kg, SS-9 near the Mark Even dock at 790 μ g/kg, and SS-7 near the seep at 880 μ g/kg. Each of these locations therefore exceeds the PRG for industrial soil. The only other SVOC that exceeded the industrial soil PRG is debenzo(a,h)anthracene, which has a PRG of 0.29 μ g/kg, at location SS-7 at a concentration of 120 μ g/kg.

Benzo(a)anthracene, which has a PRG of 2,900 μ g/kg, was also detected at SS-2, SS-7, and SS-9 at 650 μ g/kg, 920 μ g/kg, and 590 μ g/kg, respectively. Benzo(b)fluoranthene, which has an PRG of 2,900 μ g/kg, also was detected at SS-2, SS-7, and SS-9 at 870 μ g/kg, 980 μ g/kg, and 1,100 μ g/kg, respectively as well as at SS-11 at 340 μ g/kg. Several other PAH compounds were detected at these locations as well as at SS-6, SS-8, and SS-11 as indicated in Table 4-3.

LPAH, which includes the sum of concentrations for acenaphthene, acenaphthylene, fluorene, 2-methylnaphthalene, naphthalene, and phenanthrene, for surface soils detecting PAH above the RL ranged from 520 μg/kg at SS-9 to 1,206 μg/kg at SS-7. HPAH, which includes anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)pyrylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene, for surface soils detecting PAH above the RL ranged from 440 μg/kg at SS-8 to 9,110 μg/kg at SS-7. While no PRG criteria are available for LPAH or HPAH, the DEQ Portland Harbor Apparent Baseline Values for sediment (Table 4-15) for LPAH is 700 μg/kg and for HPAH is 2,400 μg/kg.

Bis(2-ethylhexyl)phthalate (BEHP), which is a common plasticizer used in the manufacture of PVC, was detected at 1,600 μ g/kg in SS-6 but the PRG for industrial soil is 180,000 μ g/kg.

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Metals

Several metals were reported above the RL at all of the surface soil sample locations (Table 4-4). © Of these, 5 metals exceeded the background concentrations for metals from Clark County, Washington, at several of the locations, including arsenic, chromium, copper, iron, and lead. Of these metals exceeding the presumed background value, arsenic and chromium concentrations in at least one location exceeded the industrial soil PRG as well.

Many metals tested, including antimony, barium, cobalt, mercury, nickel, selenium, silver, thallium, vanadium, and zinc do not have background concentrations available. Concentrations were compared directly to the industrial soil PRG.

Arsenic was reported above the background concentration of 6 mg/kg (Table 4-15) at 5 of the 11 surface soil locations ranging up to 13.3 mg/kg at SS²9. The industrial soil PRG for arsenic is 2.7 mg/kg (i.e. less than the background value), which was exceeded at 10 of the 11 surface soil locations. Chromium was reported above the background concentration of 27 mg/kg at 5 of the 11 locations ranging up to 81.3 mg/kg at SS-5. Chromium exceeds its industrial soil PRG of 64 mg/kg at one location, SS-5 at 81.3 mg/kg. Copper was reported above the background concentration of 34 mg/kg at 6 of 11 locations ranging up to 270 mg/kg at SS-9. Iron was reported above the background concentration of 36,100 mg/kg in 3 of the 11 locations ranging up to 39,100 mg/kg at SS-2. Finally, lead was reported above the background concentration of 17 mg/kg at 9 of the 11 locations ranging up to 90.7 mg/kg at SS-2.

Locations SS-3 and SS-4 were collected from the former scrap metal storage area. Arsenic exceeded the industrial soil PRG but did not exceed the presumed background concentration at these locations. Lead exceeded the background concentration at both locations, but chromium and copper exceeded the background only at location SS-4. Lead, chromium, and copper did not exceed the industrial PRGs at SS-3 or SS-4. Locations SS-3 and SS-4 were each collected as a composite sample on a four-point grid (i.e. 4 sample aliquots for each location) with approximately 25-foot spacing and homogenized to ensure that a point where metal was formerly storaged would be represented in the sample. Assuming that 3 of the 4 sample aliquot locations were collected in an aisle and only 1 location represented an actual storage site, the metal concentrations are multiplied by 4 for comparison to the background. This represents a conservative assumption. Arsenic, chromium, copper, iron, lead, and manganese exceed the background concentrations at both SS-3 and SS-4 if the results are multiplied by 4. Aluminum is also exceeded at SS-4 if the results are multiplied by 4 and chromium exceeds the industrial soil PRG at SS-4 if the results are multiplied by 4.

SS-10 failed to detect any metal above its background concentration, but arsenic was detected at 2.9 mg/kg, which exceeded the industrial soil PRG of 2.7 mg/kg. SS-1 only reported lead above

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the background and SS-8 only reported iron above background; both of these locations reported arsenic above the industrial soil PRG, however. Other surface soil locations reported at least three metals above background. All locations reported metal concentrations within an order of magnitude of the background concentration, although the copper concentration at SS-9 at 270 mg/kg was close to an order of magnitude greater than the background of 34 mg/kg. Most locations even reported metal concentrations within twice the background concentrations with the most notable exception being lead with 7 of 11 locations exceeding two times the background concentration.

PCB/TBT

PCB was not detected above the RL in any of the surface soil samples (Appendix D).

TBT was sampled for and detected above the RL at SS-1, SS-2, SS-9, and SS-10 (Table 4-5). The tri-n-butyltin cation was detected at 8 µg/kg, 120 µg/kg, 110µg/kg, and 2 µg/kg at these locations, respectively. The tri-n-butyltin cation concentration was estimated at location SS-7 below the RL. The di-n-butyltin and n-butyltin cations were also detected in most of the samples, but at lower concentrations. The sum of all butyltin analogs, including the tetra-n-butyltin, tri-n-butyltin, di-n-butyltin, and (mono-)n-butyltin, was estimated at concentrations of 0.9 µg/kg and 2.5 µg/kg at SS-7 and SS-10, respectively, and was reported at 13 μg/kg, 147 μg/kg, and 166 μg/kg at SS-1, SS-2, and SS-9, respectively. While no risk-based criteria is available for TBT, the USEPA reported a maximum baseline value of 300 µg/kg in sediment in Portland Harbor (USEPA 1998).

4.4.2 SUBSURFACE SOIL

The analytical results for all subsurface soil locations are presented in Tables 4-1 through 4-5 and are depicted graphically on the site map in Figure 4-2.

TPH

Neither DRO nor RRO was detected above the RL at SB-1, which is near the drum storage area (Figure 4-2), or at SB-3, which is near the southern Quonset hut by a former diesel UST (Table 4-1). GRO was sampled for only at SB-3, but was not detected at SB-3 either. DRO was detected at the other drum storage area (SS-2) at 27 mg/kg, but this value is close to the RL; no RRO was detected above the RL at SB-2.

DRO and RRO were, however, detected at the other subsurface soil locations near another former diesel UST and fuel pipeline near the dock (Figure 4-2). SB-4, located near the former diesel UST, reported DRO at 490 mg/kg and RRO at 1,100 mg/kg. SB-5, which was offset several feet away from the original location but still immediately adjacent to a former fuel

Revised-Final Page 4-10 11/20/00 distribution line that was located during the utility clearance, reported DRO at 91 mg/kg and RRO at 260 mg/kg.

VOC

No VOCs were detected above the RL at any of the subsurface soil locations (Table 4-2).

SVOC

Pyrene was the only SVOC (PAH compound) detected above the RL at any subsurface soil location sampled for SVOC, including SB-1, SB-2, SB-3, and SB-5 (Table 4-3). Pyrene, which has an PRG for industrial soil of 54,000,000 μ g/kg (Table 4-15), was detected at 360 μ g/kg at SB-1.

Metals

Several metals were detected above the RL in each of the 3 subsurface soil samples where metals were analyzed (SB-1, SB-2, and SB-5) (Table 4-4). However, no metal concentration at any location exceeded its background concentration (Table 4-15), although an estimated concentration for lead at SB-5 (19 mg/kg) did exceed the background concentration of 17 mg/kg. Arsenic, while not exceeding the presumed background concentration, did exceed the industrial soil PRG of 2.7 mg/kg at all three locations where the arsenic concentration ranged from 3.1 mg/kg to 3.3 mg/kg.

PCB/TBT

PCB was not detected above the RL in any of the subsurface soil samples (Appendix D).

Location SB-5 was the only subsurface soil location where TBT analysis was requested. Tri-n-butyltin, however, was not detected in SB-5 (Table 4-5). However, di-n-butyltin and n-butyltin were detected at 8 μ g/kg and 2 μ g/kg, respectively, at SB-5 for a total butyltin concentration of 10 μ g/kg. While no risk-based criteria is available for TBT, the USEPA reported a maximum baseline value of 300 μ g/kg in sediment in Portland Harbor (USEPA 1998).

4.4.3 GROUNDWATER

The analytical results for all groundwater locations are presented in Tables 4-6 through 4-8 and are depicted graphically on the site map in Figure 4-3.

TPH

TPH was not detected above the RL in the groundwater at any of the locations sampled, including GW-1, GW-2, and GW-5 (Appendix D).

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Only carbon disulfide and chloroform were detected above the RL in any of the groundwater samples (Table 4-6). Chloroform, which has an PRG for tap water of 0.16 μ g/liter (L) (Table 4-16), was detected in GW-2 at a concentration 0.75 μ g/L. Chloroform did not, however, exceed the DEQ Water Quality criteria of 1,240 μ g/L (Table 4-16). The only other VOC compound reported above the RL was carbon disulfide at 0.78 μ g/L and 0.53 μ g/L at GW-6 and GW-7, respectively. These concentrations did not exceed the RBC for tap water of 1,000 μ g/L. No DEQ Water Quality criteria is available for carbon disulfide, but the DEQ Level II Ecological Risk Benchmark Value of 0.92 μ g/L is not exceeded at any location (Table 4-16).

SVOC

SVOC compounds were detected above the RL at 2 of the 7 locations, GW-4 and GW-5 (Table 4-7). Location GW-4, which is located immediately downgradient of a former diesel UST, reported phenanthrene, fluoranthene, pyrene, chrysene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene above the RL. The following compounds were reported above the RBC for tap water at GW-4 (Table 4-15):

- benzo(a)pyrene at 13 μ g/L while the RBC for tap water is 0.0092 μ g/L;
- chrysene at 9.9 µg/L while the RBC for tap water is 9.2 µg/L; and
- indeno(1,2,3-cd)pyrene at 11 μ g/L while the RBC for tap water is 0.092 μ g/L.

The concentration of benzo(a)pyrene at GW-4 also exceeded the ecological risk benchmark value of $0.014~\mu g/L$.

Phenanthrene was detected at a concentration of 18 μ g/L at GW-4, but no PRG for tap water is available. However, the DEQ Ecological Risk Assessment Level II Screening Benchmark Value for phenanthrene is 6.3 μ g/L.

GW-5, which is located downgradient of GW-4 and adjacent to the fuel line that conveyed fuel between the USTs and the dock, also reported fluoranthene and pyrene above the RL but neither exceeded its PRG for tap water. Fluoranthene, which was reported at 13 μ g/L at GW-5, did exceed the ecological risk benchmark value of 6.16 μ g/L (Table 4-16).

Metals

Several metals were detected above the RL in all 5 of the groundwater sample locations (Table 4-8). Antimony, arsenic, iron, and manganese reported concentrations above the tap water PRG at many locations. GW-5 and GW-6 are downgradient of the former metal storage area and GW-5 reported some of the highest metal concentrations at the site, including:

arsenic from GW-5 at 36.9 μg/L while the PRG for tap water is 0.045 μg/L (Table 4-14);

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- iron from GW-5 at 89,300 $\mu g/L$ while the PRG for tap water is 11,000 $\mu g/L$; and
- manganese from GW-5 at 3,160 µg/L while the PRG for tap water 880 µg/L.

The concentration of each of these metals in the groundwater at GW-5 exceed the tap water PRG. Iron also exceeds the DEO Water Quality criteria, which is 1,000 µg/L (Table 4-16), and manganese exceeds the DEQ ecological risk benchmark value of 120 µg/L (no DEQ Water Quality criteria is available).

Aluminum, barium, chromium, copper, lead, and vanadium exceeded either the DEQ Water, Quality criteria or, if the Water Quality criteria is not available, then the DEQ ecological benchmark value at both GW-5 and GW-6. Zinc also exceeded the DEQ Water Quality criteria at GW-5.

Location GW-1, near a drum storage area, also reported some elevated metal concentrations in the groundwater, including the highest chromium concentration at the site at 39.3 µg/L. The tap water PRG is higher than this at 110 μg/L, but the DEQ Water Quality criteria is 11 μg/L. Iron was detected at 54,900 µg/L and lead at 47.5 µg/L while the tap water PRG for iron is 11.000 ug/L and the DEO Water Quality Criteria, Fresh Water Chronic Criteria, for iron is 1,000 µg/L and for lead is 3.2 µg/L. Arsenic was also detected at GW-1 at 9.3 µg/L while the tap water PRG is 0.045 µg/L. Several other metals, including aluminum, barium, cobalt, copper, manganese, vanadium, and zinc reported concentrations above either the DEQ Water Quality criteria or the DEQ ecological risk benchmark value.

The other drum storage area, represented by location GW-2, also reported metals at similar but lower concentrations. A presumably downgradient location, GW-7, also reported similar concentrations for the metals, although manganese was reported at a higher concentration than GW-1 or GW-2 and also exceeded the RBC.

4.4.4 SURFACE WATER

The analytical results for all surface water locations are presented in Tables 4-6 through 4-8 and are depicted graphically on the site map in Figure 4-4.

VOC

No VOCs were detected above the RL in the surface water samples (Table 4-6).

SVOC

No SVOCs were detected above the RL in the surface water samples (Table 4-7).

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Metals

Several metals were detected above the RL at the two surface water locations (Table 4-8), although no concentration exceeded its tap water PRG (Table 4-16). Barium was reported at a concentration of 19.4 μ g/L and 5.2 μ g/L at SW-1 and SW-2, respectively, while the DEQ ecological benchmark value for barium is 4 μ g/L (no DEQ Water Quality criteria is available).

4.4.5 SEDIMENT

The analytical results for all sediment locations are presented in Tables 4-9 through 4-14 and are depicted graphically on the site map in Figure 4-5. The sediment results are compared against the Portland Harbor Sediment Apparent Baseline Values (Table 4-15) (USEPA 1998).

TPH

DRO was detected above the RL in 6 out of the 7 sediment samples collected on or adjacent to the Marine Finance site, including the sediment from the seep (SD-1), ranging from 92 mg/kg to 2,800 mg/kg (Table 4-9, Figure 4-5). RRO was detected in 5 out of the 7 sediment locations ranging from 410 mg/kg to 2,300 mg/kg. However, no TPH (DRO or RRO) was found in either shallow or deep intervals of the upstream location, SD-6. The highest DRO and RRO concentrations were found in the shallow and deep intervals downstream of the Hendren Towboat docks at location SD-5, which is the location where a sheen was noted during both dredge (shallow) and gravity core (deep) sampling. The deep interval at SD-5 reported the highest concentration of both DRO and RRO of any sediment location at Marine Finance. Locations further downstream from this location reported diminishing concentrations.

SVOC

Several SVOC were detected above the RL in sediments (Table 4-10 and Figure 4-5) and several other compounds were estimated at concentrations above the method detection limit (MDL) but less than the RL. All SVOCs detected could not be listed individually on Figure 4-5, so a total SVOC concentration is listed. The SVOCs detected were predominantly PAHs. Most compounds detected were found consistently in the sediments adjacent to the site with the highest SVOC concentrations in the deep interval at SD-5 immediately downstream of Hendren Towboat, although the upstream location (SD-6) generally reported lower concentrations than other locations in the Willamette River. The upstream location (SD-6) did not report any SVOC above the Portland Harbor Apparent Baseline Values (Table 4-15).

Both the LPAH and HPAH concentrations at SD-1 (the seep), SD-2S, and SD-3S were less than the Portland Harbor Apparent Baseline Values (Table 4-15) and no SVOCs at these locations exceeded the Portland Harbor Apparent Baseline Values. Note that no samples were obtained from the deep interval at locations SD-2 or SD-3. The seep location, SD-1, reported most of the

same SVOCs detected in the sediments of the Willamette River adjacent to the site, although concentrations in the seep location were generally lower than those reported in the river samples. The exceptions included (1) benzo(a)anthracene reported at 120 μg/kg in SD-1 while the shallow river samples nearby in SD-2S and SD-3S were 93 μg/kg and 110 μg/kg, respectively; concentrations downstream of the Hendren Towboat dock were substantially higher (up to 28,000 μg/kg in the deep interval); (2) chrysene reported at 140 μg/kg versus 120 μg/kg and 130 μg/kg at SD-2S and SD-3S, respectively; (3) benzo(k)fluoranthene reported at 55 μg/kg versus 38 μg/kg and 41 μg/kg at SD-2S and SD-3S, respectively; and (4) benzo(a)pyrene at 120 μg/kg versus 100 μg/kg and 110 μg/kg at SD-2S and SD-3S, respectively.`

SVOC concentrations were highest in both the shallow and deep intervals immediately downstream of the Hendren Towboat dock at location SD-5 (Table 4-10) while the upstream location, SD-6, reported substantially lower concentrations. The deep interval at SD-5 consistently reported higher concentrations of PAHs than the shallow interval. SVOC concentrations generally diminished downstream from SD-5 (Table 4-10 and Figure 4-5). LPAH and HPAH exceeded the Portland Harbor Apparent Baseline Values in both the shallow and deep intervals at both SD-4 and SD-5. LPAH and HPAH were exceeded by over an order of magnitude in the shallow interval at SD-5 and were exceeded by over two orders of magnitude in the deep interval at SD-5.

Several PAHs and other SVOCs exceeded the Portland Harbor Apparent Baseline Values in both the shallow and deep intervals at both SD-4 and SD-5 (Table 4-10). Compounds exceeding the baseline values generally were consistent between these samples, including chrysene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. Concentrations of these compounds at SD-4S, SD-4D, and SD-5S were generally within an order of magnitude of the baseline values. However, concentrations at SD-5D were generally over an order of magnitude greater than the baseline values and some compounds such as phenanthrene and pyrene each with a baseline value of 700 µg/kg were exceeded by over two orders of magnitude at SD-5D at 120,000 µg/kg and 130,000 µg/kg, respectively.

Several compounds were detected above the baseline values at SD-5 but not above the baseline values at any other location, although the compounds were generally identified even in the upstream location (SD-6). Dibenzofuran was detected in the deep interval at SD-5 at 1,500 μ g/kg and estimated above the MDL in the shallow interval at 200 μ g/kg while the baseline value is 100 μ g/kg. Fluorene was also found in both the shallow and deep intervals at SD-5 at 1,600 μ g/kg and 16,000 μ g/kg, respectively, while the baseline value is 125 μ g/kg. Dibenzo(a,h)anthracene was detected at 1,900 μ g/kg at SD-5D and was estimated above the MDL at 400 μ g/kg at SD-5S while the baseline value is 125 μ g/kg.

Metals

Several metals were detected above the RL in both the shallow and deeper sediments (Table 4-11). Arsenic, copper, lead, mercury, and zinc exceeded the Portland Harbor Apparent Baseline Values (Table 4-15) in at least one location. The upstream location, SD-6, reported metal concentrations less than the baseline values, except that mercury was reported at 0.14 mg/kg in SD-6D which is slightly above the baseline value of 0.1 mg/kg.

SD-1, which is located in the seep near the Mark Even dock, reported lead and zinc above their baseline values at SD-1 at 36.4 mg/kg and 203 mg/kg, respectively. Note that the seep was found to have several pieces of metal debris during sampling, including a rusted steel cable and electrical wire.

SD-2S, which is near Mark Even Construction, did not report any metal above its baseline value.

SD-3S, which is adjacent to the central dock, reported arsenic, copper, and zinc at 11.1 mg/kg, 98.5 mg/kg, and 273 mg/kg, respectively. Each of these values is within approximately twice the baseline values.

No metals in either the shallow or deep intervals at location SD-4 exceed the baseline values with the exception of zinc at SD-4S, which was reported at 120 mg/kg while the baseline value is 118 mg/kg.

Several metals exceed their baseline values in both the shallow and deep intervals at SD-5, including lead, mercury, and zinc. However, the concentrations reported for mercury and zinc in both intervals and lead in the deep interval are within twice the baseline value. Lead in the shallow interval was reported at 232 mg/kg while the apparent baseline value is 30 mg/kg. Arsenic was also detected above its baseline value of 5 mg/kg in the shallow interval at SD-5 at 5.8 mg/kg.

PCB/TBT

TBT was detected above the RL or estimated above the MDL but less than the RL in all sediment samples except the deep interval at the upstream location, SD-6 (Table 4-12). The sum of all butyltin analogs, including tetra-n-butyltin, tri-n-butyltin cation, di-n-butyltin cation, and (mono-)n-butyltin cation, was estimated at concentrations ranging from 1 μ g/kg at SD-5D to 142 μ g/kg at SD-3S. The shallow interval at the upstream location SD-6 reported 35 μ g/kg and the shallow intervals exceeding this value are SD-3S at 142 μ g/kg, SD-4S at 91 μ g/kg, and SD-5S at 57.5 μ g/kg. However, each of these concentrations is an estimated value above the MDL. The deep intervals at SD-4 and SD-5 report total TBT (2.6 μ g/kg and 1 μ g/kg, respectively) less than the value at SD-6S. While no risk-based criteria is available for TBT, the USEPA reported a

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maximum baseline value of 300 μ g/kg in sediment in Portland Harbor (USEPA 1998) for which no sediment sample in the Willamette River adjacent to the Marine Finance site exceeded.

Aroclor 1260 was the only PCB species detected above the RL in any sediment samples (Table 4-13), although no concentration exceeded the Portland Harbor Apparent Baseline Value of 180 μ g/kg (Table 4-15). The seep location (SD-1) and the deep interval of the upstream location (SD-6) failed to detect any PCB above the RL while all other locations did detect PCB. PCB ranged from an estimated concentration of 8 μ g/kg in the shallow interval of the upstream location to 76 μ g/kg in the deep interval at SD-5D.

Total Organic Carbon

TOC concentrations are reported in Table 4-14. TOC ranges from 1.51 percent (%) to 2.79% in the shallow interval and 0.92% to 4.37% in the deep interval. The Portland Harbor Apparent Baseline Value for TOC is 2%, so all sediment exceeds this value except SD-1, SD-4S, and SD-6D.

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5.0 SUMMARY

The following briefly summarizes the contaminants by media that exceed the relevant criteria as discussed in more detail in Section 4.0.

Surface Soil

200

TPH was detected above the RL in seven of the eight locations up to a concentration of 11,200 mg/kg. No VOC was detected above the PRGs. Benzo(a)pyrene was reported above the industrial soil PRG at 3 locations, SS-2, SS-7, and SS-9. Dibenzo(a,h)anthrancene was reported above the industrial soil PRG at location SS-7 only. Arsenic, chromium, copper, iron, and lead exceeded the presumed background concentration at several locations in the surface soil and arsenic and chromium exceeded the industrial soil PRG. Two composite samples were collected near the former scrap metal storage area. Lead was detected above the background value at both of these locations and chromium and copper were detected above the background value at one of the locations. All TBT results were less than the Portland Harbor Apparent Baseline Value for sediment, although no TBT criteria is available for surface soil.

Subsurface Soil

TPH was detected above the RL at two subsurface soil locations near former USTs ranging up to 1,590 mg/kg. No VOC was detected above the RL in any subsurface soil locations and only pyrene was reported above the RL at one location, but the result was less than the industrial soil PRG. Only lead was detected at one location at a concentration of 19 mg/kg above the background value of 17 mg/kg. Arsenic, while less than the background value, was reported above the industrial soil PRG at all three subsurface soil locations that were sampled for metals.

Groundwater

TPH was not detected in any sample above the RL. The only VOCs detected above the RL were chloroform and carbon disulfide, but only chloroform exceeded its tap water PRG at one location. SVOCs were detected above the RL at 2 of the 7 locations, but only benzo(a)pyrene, chrysene, and indeno(1,2,3-cd)pyrene at GW-4 exceeded the PRG for tap water. Benzo(a)pyrene and phenanthrene, which has no tap water PRG available, both exceeded their DEQ ecological risk benchmark values at GW-4. Fluoranthene did not exceed the tap water PRG at GW-5, but it did exceed the DEQ ecological risk benchmark value. Antimony, arsenic, iron, and manganese were reported above the PRGs for tap water at most locations. GW-5 and GW-6 are downgradient of the former scrap metal storage yard and the groundwater at these locations reported some of the highest arsenic, iron, and manganese concentrations at the site.

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Surface Water

No VOCs or SVOCs were reported above the RL in surface water from the standpipe or the seep. No metals were reported above the PRGs for tap water, but barium was detected in both surface water samples above the DEQ ecological risk benchmark values.

Sediment

TPH was reported above the RL in 6 of the 7 locations sampled. The highest TPH concentration was reported in SB-5 located immediately downstream of Hendren Towboat. A sheen was noted on the sediment from SB-5 during sample collection. SVOCs, predominantly PAH compounds, were also reported in the highest concentrations at SB-5. Portland Harbor Apparent Baseline Values for LPAH and HPAH were exceeded in both the shallow and deep intervals at locations SB-4 and SB-5, which are both downstream and adjacent to the Hendren Towboat docks. Several individual SVOCs also exceeded their baseline values at SB-4 and SB-5. The metal concentrations in the upstream sediment location at SD-6 were consistent with baseline values, but arsenic, copper, lead, mercury, and zinc exceeded their baseline values in at least one location. No TBT concentrations exceeded the available baseline value and no PCB concentrations exceeded the Portland Harbor Apparent Baseline Value.



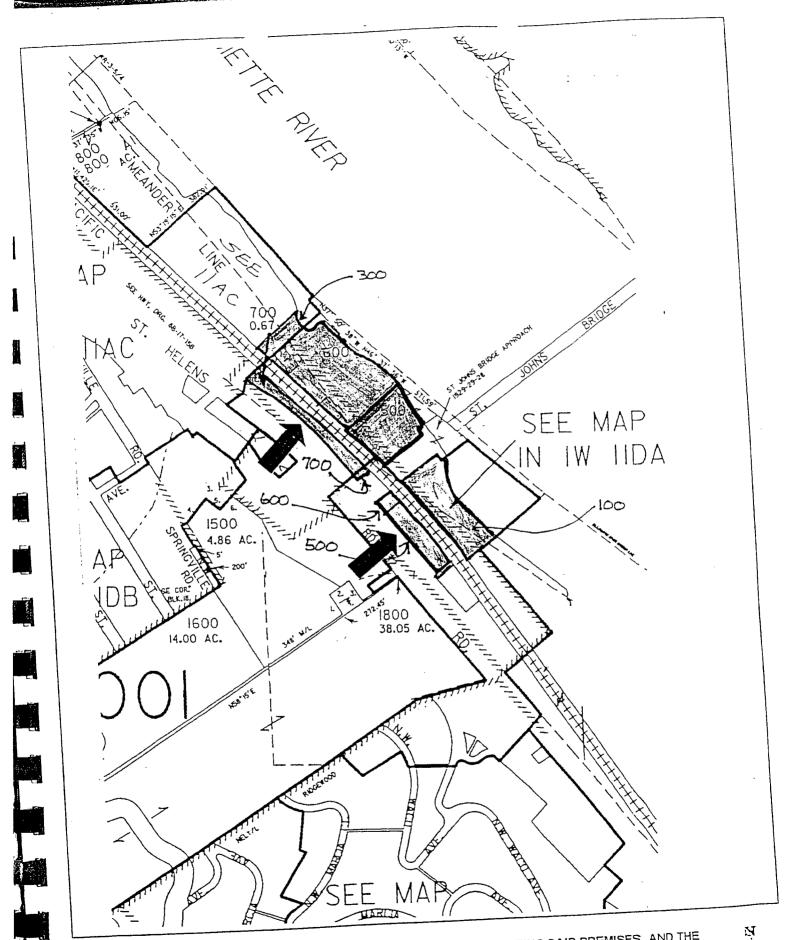
This binder is information on the property at; 8444 Wi NW St. Helens Rd, Portland, OR

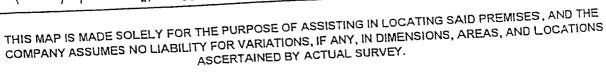
It has plat maps and some property information that you may find useful.

Thank you for your interest.

Sincerely,

Dale Burkholder







Department of Environmental Quality

Northwest Region Portland Office 2020 SW 4th Avenue, Suite 400 Portland, OR 97201-4987 (503) 229-5263 FAX (503) 229-6945 TTY (503) 229-5471

December 12, 2002

Gordon T. Carey, Jr. 721 SW Oak Street 2nd Floor Portland, Oregon 97205

Re: DEQ Project Costs and

Scope of Work for Further Investigation

Marine Finance Site

8444 NW St. Helens Road,

Portland, Oregon ECSI #2352

Dear Mr. Carey:

Through communication with Charlie Landman you have requested that the Oregon Department of Environmental Quality (DEQ) provide detailed DEQ project costs for the Marine Finance Corporation site. Enclosed please find invoices and direct labor summaries for the costs incurred by the Oregon Department of Environmental Quality (DEQ) between February 1999 and November 1, 2002. The invoice for November 2002 is pending, but will total approximately \$200.

DEQ's costs were incurred using the Orphan Site account. Oregon's Environmental Cleanup Law (Oregon Revised Statutes (ORS) 465.381) established an Orphan Site account to investigate and clean up hazardous substance contamination at high priority sites where the responsible party is unknown, unwilling, or unable to undertake the required actions. DEQ determined that Marine Finance was an "unwilling" party, therefore, DEQ performed the required Expanded Preliminary Assessment (XPA) using our environmental contractor at the time, Jacob's Engineering. DEQ's determination is documented in the Orphan Declaration Memorandum signed July 6, 2000.

The total project cost as of 11/01/02 is \$116,553.90. Costs included in this total that were incurred by DEQ's contractor, Jacobs Engineering, totaled \$64,629.10.

The following is a summary of the work conducted by DEQ that resulted in the incurred charges.

In February 1999, DEQ's Site Assessment Section (SAS) sent an information request letter to Marine Finance and began preparation of a Strategy Recommendation Memorandum to document environmental conditions and priority for further action at the site. The Strategy Recommendation was finalized on September 27, 1999. DEQ's SAS determined the site was a high priority for completion of a Preliminary Assessment with sampling, also referred to as an Expanded Preliminary Assessment (XPA). After several months of correspondence DEQ declared the site an Orphan project in July 2000 after determining that Marine Finance



Corporation was unwilling to investigate or clean up the site. DEQ retained Jacobs Engineering to complete the Expanded Preliminary Assessment (XPA). Jacobs collected soil, groundwater and sediment samples at the site in August 2000, and submitted the XPA report in November 2000. DEQ completed removal of abandoned waste containers, drums, and batteries at the facility in May 2001. The XPA included collection of six groundwater samples, five Willamette River sediment samples, and thirteen soil samples. In general, samples were analyzed for metals, total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs; except sediments), semi-volatile organics (SVOCs), total organotins (includes tributyltin (TBT)), and polychlorinated biphenyls (PCBs).

Scope of Work for Completion of Site Characterization

In general, the results of the XPA indicate the contamination is not widespread at the site. However, DEQ has determined that further work is needed to complete the site characterization. The additional data will allow a determination of to be made as to whether the site is a current source of contaminants to the Willamette River. This determination is consistent with the United States Environmental Protection Agency (EPA) requirements for all potential contaminant sources within the Portland Harbor area.

For your information a general scope of work that DEQ will require for completion of the site characterization is as follows:

- Collection of additional surface soil samples at approximately 10 locations to better define the lateral extent of surface soil contamination
- Soil sampling from at least two discrete depth intervals at locations with the highest contaminant levels in surface soil (SS-2, SS-7, SS-9), and from the former UST location
- Installation and quarterly monitoring (one year minimum) of approximately six (6)
 monitoring wells across the eastern side of the property to assess shallow groundwater
 contaminants potentially discharging to the Willamette River.

Depending on the results of the additional investigation, DEQ may require a DEQ-approved soil management plan. This document would provide guidance during future construction activities in the event contaminated soils are encountered or otherwise require excavation to facilitate site development.

In addition to further site characterization activities, DEQ may require a deed restriction on groundwater use at the site (i.e., no wells could be installed for industrial, commercial or drinking water purposes). Based on the results of the further investigation, DEQ will determine whether additional actions are necessary to assure protection of human health or the environment. For example, a site cap (gravel or pavement, if not covered by structures) may be required to limit contact with site soils and a storm water management plan (collection system and monitoring plan) may be needed to prevent discharges to the river.



If you have any questions or comments about the information presented in this letter, please contact me at (503) 229-5587.

Sincerely,

Mark Pugh, Project Manager Cleanup and Spills

Attachment: Project Invoices and Daily Time Logs

cc: Charlie Landman, DEQ (w/o attach.)
Rod Struck, DEQ CU/PH (w/o attach.)

Dale Burkholder, Gibson, Bowles, Inc. (w/o attach.)

ECSI file #2352 (w/o attach.)

Oregon Title Insurance Company

1515 SW Fifth Ave. Suite 840 Portland, OR 97201 Phone: (503) 220-8352 Fax (503) 228-8844

PROPERTY PROFILE

Mulmomah (OR)

OWNERSHIP INFORMATION

Ref Parcel Number: 1N1W11DA 500 T: 01N R: 01W S: 11 Q: SE : R324066 Parcel # Map Number: 2220

: Marine Finance Corp Owner

CoOwner

Site Address : 8444 Wi NW St Helens Rd Portland

Mail Address: 8316 N Lombard St #427 Portland Or 97203

Telephone : Owner:

SALES AND LOAN INFORMATION

Loan Amount: Transferred : Lender Document # : 2791-3284 Loan Type : Sale Price : Interest Rate: Deed Type : % Owned : 100 Vesting Type:

ASSESSMENT AND TAX INFORMATION

: 001 Levy Code : \$39,090 : \$470.05 Mkt Land 01-02 Taxes Mkt Structure MAV Total : \$39,090 Mkt Total Adjusted MAV : Assessed Total : \$22,570 % Improved Exempt Amount: Exception RMV: Exempt Type Exception AV : 20.8265 Millrate

PROPERTY DESCRIPTION

Map Page & Grid : Block: : Tract: Census Improvement Type: Ga General Industrial

; Ihis Subdivision/Plat : Neighborhood Cd : 600

: 371 Other, Industrial, Improved Land Use : SECTION 11 1 N 1 W; TL 500 0.49 Legal

: ACRES MAP 2220

IMPROVEMENTS

Bedrooms Bathrooms Family Room Kitchen Dming Room Floor Cover Fireplace Cooling Heat Method Heat Source Intercom Building Style Building SF 1st Floor SF 2nd Floor SF Attic Sq Footage : Bsmt Fin SF BsmtUnfinSF Bsmt Total SF Total Living SF Garage SF Pool Deck SF Deck Stories Total Units : PS Class Code Year Built Year Acquired Lot Acres Lot SF Paving Material Electric Service Nuisance Sewer Foundation Wall Material Roof Material Roof Shape : Various Imps Const Type

1515 SW Fifth Ave. Suite 840 Portland, OR 97201

Phone: (503) 220-8352 Fax (503) 228-8844

PROPERTY PROFILE

Mulmomah (OR)

OWNERSHIP INFORMATION

Ref Parcel Number: 1N1W11DA 100 : R324078 Parcel# T: 01N R: 01W S: 11 Q: SE Map Number: 2220

: Marine Finance Corp Owner

CoOwner :

Site Address : 8444 Wi NW St Helens Rd Portland

Mail Address: 8316 N Lombard St #427 Portland Or 97203

Tenant: Telephone : Owner:

SALES AND LOAN INFORMATION

Loan Amount: Transferred : Lender : Document # : 2791-3284 Loan Type Sale Price : Interest Rate Deed Type : Vesting Type: % Owned : 100

ASSESSMENT AND TAX INFORMATION

: 001 Levy Code : \$291,820 Mkt Land : \$3,541.76 01-02 Taxes : \$1,430 Mkt Structure MAV Total : \$293,250 Mkt Total Adjusted MAV : % Improved Assessed Total : \$170,060 Exempt Amount: \$155,650 Exception RMV: Exempt Type Exception AV : : 20.8265 Millrate

PROPERTY DESCRIPTION

Map Page & Grid : : Tract: Block: Census Improvement Type: Ga General Industrial

: This Zoning Subdivision/Plat :

Neighborhood Cd: 600

: 371 Other, Industrial, Improved Land Use

: SECTION 11 1N 1W; TL 100 1.53 ACRES Legal

: MAP 2220

IMPROVEMENTS

Bedrooms Bathrooms Family Room Kitchen Dining Room Floor Cover Fireplace Cooling Heat Method Heat Source Intercom -Building Style Building SF 1st Floor SF 2nd Floor SF Attic Sq Footage Bsmt Fin SF **BsmtUnfinSF** Bsmt Total SF Total Living SF Garage SF Pool Deck SF Deck Stories Total Units : PS Class Code Year Built Year Acquired : 1.53 Lot Acres : 66,650 Lot SF Paving Material Plectric Service Nuisance Sewer Foundation Wall Material Roof Material Roof Shape · Various Imps Const Type

1515 SW Fifth Ave. Suite 840 Portland, OR 97201 Phone. (503) 220-8352 Fax (503) 228-8844

PROPERTY PROFILE

Multnomah (OR)

OWNERSHIP INFORMATION

Ref Parcel Number: 1N1W11DA 700 : R324081 Parcel # T: 01N R: 01W S: 11 Q: SE

Map Number: 2220

: Marine Finance Corp Owner

CoOwner

Site Address : 8444 Wi NW St Helens Rd Portland

Mail Address: 8316 N Lombard St #427 Portland Or 97203

Telephone : Owner:

Tenant:

SALES AND LOAN INFORMATION

Loan Amount: Transferred : Lender Document# : 2791-3284 Loan Type Sale Price Interest Rate: Deeh Type : % Owned : 100 Vesting Type:

ASSESSMENT AND TAX INFORMATION

: 001 Levy Code : \$2,600 Mkt Land : \$31.46 01-02 Taxes Mkt Structure MAV Total : \$2,600 Mkt Total Adjusted MAV : % Improved Assessed Total : \$1,510 Exempt Amount: Exception RMV: Exempt Type Exception AV : : 20.8265 Millrate

PROPERTY DESCRIPTION

Map Page & Grid :

: Tract: Black: Census Improvement Type: Ga General Industrial

: Ihi Zoning

Subdivision/Plat :

Neighborhood Cd: 600

: 371 Other, Industrial, Improved Land Usc : SECTION 11 1 N 1 W; TL 700 0.05 Legal

: ACRES MAP 2220

IMPROVEMENTS

Bedrooms Bathrooms Family Room Kitchen Dining Room Floor Cover Fireplace Cooling Heat Method Heat Source Intercom Building Style Building SF 1st Floor SF 2nd Floor SF Attic Sq Footage : Bsmt Fin SF **BsmtUnfinSF** Bsmt Total SF Total Living SF Garage SF Pool Deck SF Deck Stories Total Units : PS Class Code Year Built Year Acquired Lot Acres Lot SF Paving Material Electric Service Nuisance Sewer Foundation Wall Material Roof Material Roof Shape : Various Imps Const Type

1515 SW Fifth Avc. Suite 840 Portland, OR 97201

Phone: (503) 220-8352 Fax (503) 228-8844

PROPERTY PROFILE

Mulmomah (OR)

OWNERSHIP INFORMATION

: R324082 Parcel #

Ref Parcel Number: 1N1W11DA 600 T: 01N R: 01W S: 11 Q: SE

Map Number: 2220

: Marine Finance Corp

Owner

Site Address : 8444 Wi NW St Helens Rd Portland

Mail Address: 8316 N Lombard St #427 Portland Or 97203

Telephone : Owner:

SALES AND LOAN INFORMATION

Transferred : Document # : 2791-3284

Sale Price Deed Type

% Owned

: 100

Loan Amount: Lender : Loan Type :

Interest Rate : Vesting Type:

ASSESSMENT AND TAX INFORMATION

: \$12,600 Mkt Land Mkt Structure :

: \$12,600

Mkt Total % Improved Exempt Amount: Exempt Type

Millrate

: 20.8265

Levy Code 01-02 Taxes MAV Total Adjusted MAV :

: \$151.61

: 001

Assessed Total : \$7,280 Exception RMV:

Exception AV :

PROPERTY DESCRIPTION

Map Page & Grid :

Census

Block : Tract:

Improvement Type: Ga General Industrial This Zoning

Subdivision/Plat : Neighborhood Cd : 600

Land Use

: 371 Other, Industrial, Improved

: SECTION 11 1 N 1 W; TL 600 0.17

: ACRES MAP 2220

IMPROVEMENTS

Bedrooms

Bathrooms Family Room Kitchen

Dining Room

Floor Cover Fireplace

Cooling

Heat Method Heat Source Intercom

Building Style Building SF

1st Floor SF 2nd Floor SF

Attic Sq Footage Bsmt Fin SF

BsmtUnfinSF Bsmt Total SF

Total Living SF Garage SF

Pool Deck SF

Deck Stories

Total Units Class Code Year Built

Year Acquired Lot Acres

: PS

Lot SF Paving Material

Electric Service Nuisance

Sewer Foundation

Wall Material Roof Material

Roof Shape Const Type

Various Imps

1515 SW Fifth Ave. Suite 840 Portland, OR 97201

Phone: (503) 220-8352 Fax (503) 228-8844

PROPERTY PROFILE

Multnomah (OR)

OWNERSHIP INFORMATION

: R483759 Parcel#

Ref Parcel Number: INIWIIDA 101

T: 01N R: 01W S: 11 Q: SE

Map Number : Owner

Marine Finance Corp

CoOwner

Site Address : *No Site Address*

Mail Address: 8316 N Lombard St #427 Portland Or 97203

Telephone : Owner:

Tenant:

SALES AND LOAN INFORMATION

Transferred :

Document# : 27913284

Sale Price :

Del Type : Brgn, Grant & Sale

Loan Type : Interest Rate :

% Devned :

Vesting Type:

Loan Amount:

Lender

ASSESSMENT AND TAX INFORMATION

Mkt Land

: \$25,530

Levy Code 01-02 Taxes

: 001 : \$269.71

Mkt Structure Mkt Total

: **\$**25,530

MAV Total

Adjusted MAV :

% Improved Exempt Amount: \$11,870

Assessed Total : \$12,950

Exempt Type :

Exception RMV

Millrate

: 20.8265

Exception AV :

PROPERTY DESCRIPTION

Map Page & Grid :

Census : Tract:

Block:

Improvement Type: A Vacant Land

Zoning

Subdivision/Plat :

Neighborhood Cd: 600

Land Use

: 370 Other, Industrial, Unimproved

Legal

: SECTION 11 IN 1W; TL 101 0.11 ACRES

IMPROVEMENTS

Bedrooms

Bathrooms

Family Room

Kitchen

Dining Room

Floor Cover

Fireplace

Cooling

Heat Method

Heat Source

Intercom

Building Style

Building SF

1st Floor SF

2nd Floor SF

Attic Sq Footage :

Bsmt Fin SF

BemtUnfinSF

Bsmt Total SF

Total Living SF

Garage SF

Pool

Deck SF

Deck . Stories

Total Units

Class Code

Year Built

Year Acquired

Lot Acres Lot SF

Paving Material :

: 4,780

Electric Service

Nuisance

Sewer

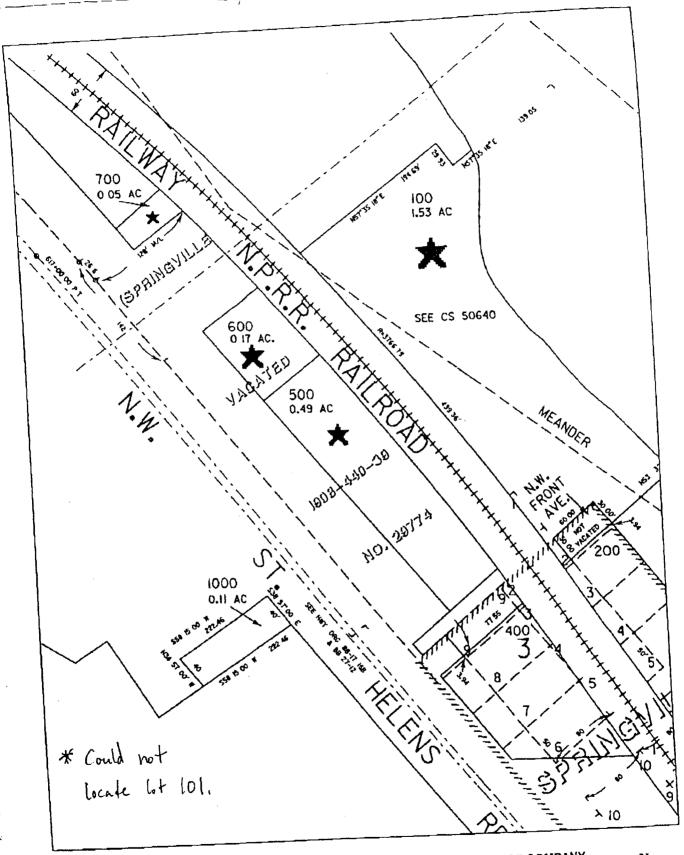
Foundation

Wall Material

Roof Material

Roof Shape

Const Type



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1515 SW Fifth Ave. Suite 840 Portland, OR 97201 Phone: (503) 220-8352 Fax (503) 228-8844

PROPERTY PROFILE

Multnomah (OR)

OWNERSHIP INFORMATION

Ref Parcel Number: 1N1W11 500 Parcel# : R483757 T: 01N R: 01W S: 11 Q:

Map Number:

: Marine Finance Corp

Owner

CoOwner

Site Address: *No Site Address*

Mail Address: 8316 N Lombard St #427 Portland Or 97203

Telephone : Owner:

Tenant:

SALES AND LOAN INFORMATION

Loan Amount: Transferred : Lender Document # : 27913084 Loan Type :

Sale Price

Deed Type : Brgn, Grant & Sale

% Owned

Interest Rate :

Vesting Type:

ASSESSMENT AND TAX INFORMATION

: 001 Levy Code Mkt Land : \$280,660 : \$2,978.62 01-02 Taxes Mkt Structure

: \$280,660 Mkt Total

% Improved

Exempt Amount:

Exempt Type

Assessed Total : \$143,020

Exception RMV:

Adjusted MAV :

MAV Total

Exception AV : 20.8265 Millrate

PROPERTY DESCRIPTION

Map Page & Grid : Block: : Tract:

Ccnsus Improvement Type: A Vacant Land

Zoning

Subdivision/Plat :

Neighborhood Cd: 600

Land Use

Legal

: 370 Other, Industrial, Unimproved

: SECTION 11 1N 1W;TL 500 1.29 ACRES

IMPROVEMENTS

Bedrooms

Bathrooms Family Room

Kitchen Dining Room

Floor Cover

Fireplace Cooling

Heat Method Heat Source

Intercom

Building Style Building SF

1st Floor SF

2nd Floor SF Artic Sq Footage

Bsmt Fin SF

BerntUnfinSF

Bent Total SF Total Living SF

Garage SF

Pool

Deck SF

Deck

Stories

Total Units

Class Code

Year Built

Year Acquired

: 1.29

: 56,185

Lot Acres

Lot SF

Paving Material

Electric Service

Nuisance

Sewer

Foundation

Wall Material

Roof Material

Roof Shape

Const Type

1515 SW Fifth Ave. Suite 840 Portland, OR 97201

Phone: (503) 220-8352 Fax (503) 228-8844

PROPERTY PROFILE

Mulmomalı (OR)

OWNERSHIP INFORMATION

: R324083 Parcel#

Ref Parcel Number: 1N1W11 600 T: 01N R: 01W S: 11 Q:

Map Number: 2120

Owper

Marine Finance Corp

CoOwner

Site Address : 8444 NW Saint Helens Rd Portland 97231 Mail Address: 8316 N Lombard St #427 Portland Or 97203

Telephone : Owner:

Tenant:

SALES AND LOAN INFORMATION

Transferred :

Document # : 2791-3284

Sale Price

Deed Type : % Owned : 100

Lender Loan Type : Interest Rate:

Loan Amount:

Vesting Type:

ASSESSMENT AND TAX INFORMATION

Mkt Land

: \$394,550 Mkt Structure : \$186,360 Levy Code 01-02 Taxes MAV Total

\$6,446.65

: 001

: \$580,910 Mkt Total : 32 % Improved

Adjusted MAV : Assessed Total: \$309,540

Exempt Amount : Exempt Type

Exception RMV:

Millrate

: 20.8265

Exception AV

PROPERTY DESCRIPTION

Map Page & Grid : 565 F3

: Tract: 43.00 Block: 2

Census

Improvement Type: Oa Garage/Shop -15K Sf : Hi

Zoning Subdivision/Plat : Neighborhood Cd: 600

Land Use 371 Other, Industrial, Improved

: SECTION 11 1 N 1 W, TL 600 2.81

: ACRES MAP 2120

IMPROVEMENTS

Bedrooms

Bathrooms Family Room

Kitchen Dining Room

Floor Cover Fireplace

Cooling Heat Method

Heat Source Intercom

Building Style Building SF

: 16,800 : 16,800 1st Floor SF

16,800

: 1

: PS

: 1946

2nd Floor SF Attic Sq Footage : Bsmt Fin SF

BannUnfinSF

Bsmt Total SF Total Living SF

Garage SF Pool

Deck SF Deck

Stories Total Units Class Code

Year Built Year Acquired

Lot Acres Lot SF

Paving Material Electric Service

Nuisance Sewer Foundation

Wall Material Roof Material

Roof Shape

Const Type

: Various Imps

1515 SW Fifth Ave. Suite 840 Portland, OR 97201

Phone: (503) 220-8352 Fax (503) 228-8844

PROPERTY PROFILE

Mulmomah (OR)

OWNERSHIP INFORMATION

: R324069 Parcel #

Ref Parcel Number: 1N1W11 700

Map Number: 2120

T: 01N R: 01W S: 11 Q:

Owner

. Marine Finance Corp

CoOwner

Site Address: *No Site Address* Portland

Mail Address: 8316 N Lombard St #427 Portland Or 97203

Telephone : Owner:

Tenant:

SALES AND LOAN INFORMATION

Transferred :

Loan Amount:

Document # : 2791-3284

Lender Loan Type :

Sale Price Deed Type :

Interest Rate:

% Owned

Vesting Type:

ASSESSMENT AND TAX INFORMATION

Mkt Land Mkt Structure : \$30,990

: 001 Levy Code 01-02 Taxes

: \$313.65

Mkt Total

: \$30,990

MAV Total

% Improved

Exempt Amount: \$13,800

Adjusted MAV : Assessed Total : \$15,060

Exempt Type

Exception RMV:

Millrate

: 20.8265

Exception AV

PROPERTY DESCRIPTION

Map Page & Grid :

Census

: Tract:

Block:

Improvement Type: A Vacant Land

: Hi

Zoning Subdivision/Plat

Neighborhood Cd : 600

Land Use

: 370 Other, Industrial, Unimproved

: SECTION 11 IN 1W; TL 700 0.67 ACRES

: MAP 2120

The Information Provided is Deemed Reliable, but Is Not Guaranteed

1st Floor SF 2nd Floor SF Attic Sq Footage Bsmt Fin SF BsmtUnfinSF Bsmt Total SF Total Living SF Garage SF Pool Deck SF Deck Stories Total Units Class Code Year Built Year Acquired Lot Acres : 28,968 Lot SF Paving Material Electric Service Nuisance Sewer Foundation Wall Material Roof Material Roof Shape : Various Imps Const Type

IMPROVEMENTS

Redrooms

Bathrooms

Kitchen

Family Room

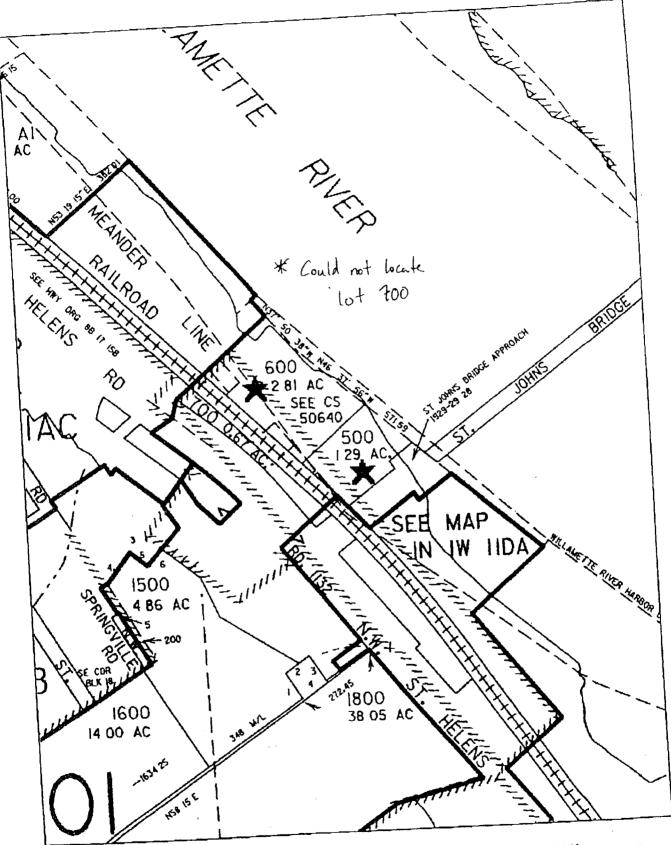
Dining Room

Floor Cover

Building SF

Fireplace

Cooling Heat Method Heat Source Intercom Building Style 2



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Oregon Title Insurance Company

1515 SW Fifth Ave. Suite 840 Portland, OR 97201

Phone: (503) 220-8352 Fax (503) 228-8844

PROPERTY PROFILE

Mulmomah (OR)

OWNERSHIP INFORMATION

Ref Parcel Number: 1N1W11AC 300 : R324072 T: 01N R: 01W S: 11 Q: NE Parcel #

Map Number: 2120 : Marine Finance Corp Owner

Site Address: 8444 Wi NW St Helens Rd Portland

Mail Address: 8316 N Lombard St #427 Portland Or 97203

Telephone : Owner:

SALES AND LOAN INFORMATION

Loan Amount: Transferred : Lender Document# : 2791-3284 Loan Type : Sale Price Interest Rate: Deed Type : Vesting Type: 100 % Owned

ASSESSMENT AND TAX INFORMATION

ASSEMBLICA	
Mkt Land : \$35,060 Mkt Structure : Mkt Total : \$35,060 % Improved : Exempt Amount : \$18,540 Exempt Type Millrate : 20.826	MAV Total Adjusted MAV Assessed Total Exception RMV

PROPERTY DESCRIPTION

Map Page & Grid :

Block: : Tract: Census Improvement Type: Oa Garage/Shop -15K Sf

: Hi Zoning Subdivision/Plat

Neighborhood Cd: 600

: 371 Other, Industrial, Improved Land Usc : SECTION 11 IN 1W; TL 300 0.34 ACRES

Legal : MAP 2120

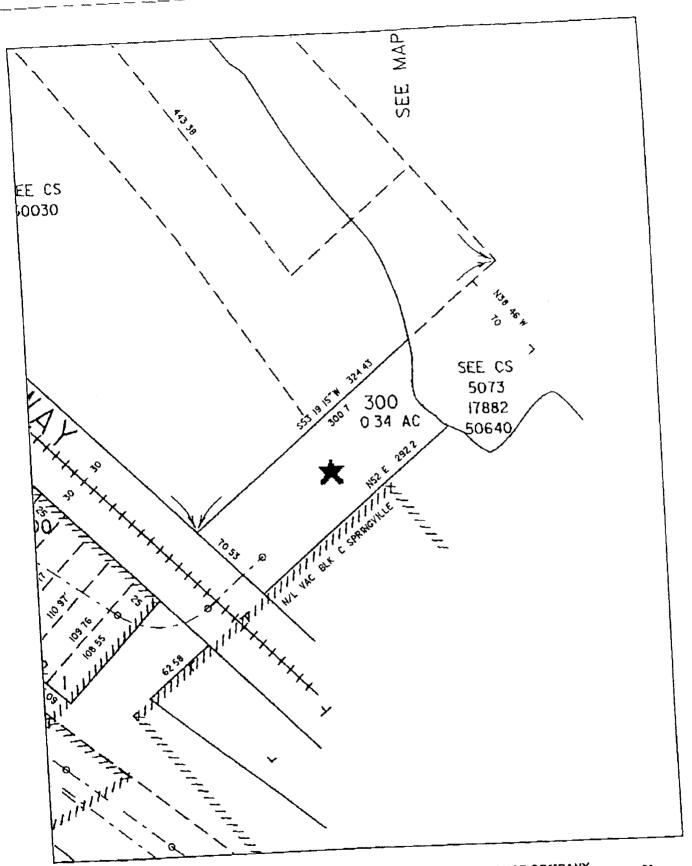
IMPROVEMENTS

Bedrooms Bathrooms Family Room Kitchen Dining Room Floor Cover Fireplace Cooling Heat Method Heat Source Intercom Building Style Building SF 1st Floor SF 2nd Floor SF Attic Sq Footage Bsmt Fin SF BsmtUnfinSF Bsmt Total SF Total Living SF Garage SF Pool Deck SF Deck Stories Total Units : PS Class Code Year Built Year Acquired : .34 Lot Acres : 14,811 Lot SF Paving Material : Electric Service Nuisance Sewer Foundation Wall Material Roof Material

Roof Shape

Const Type

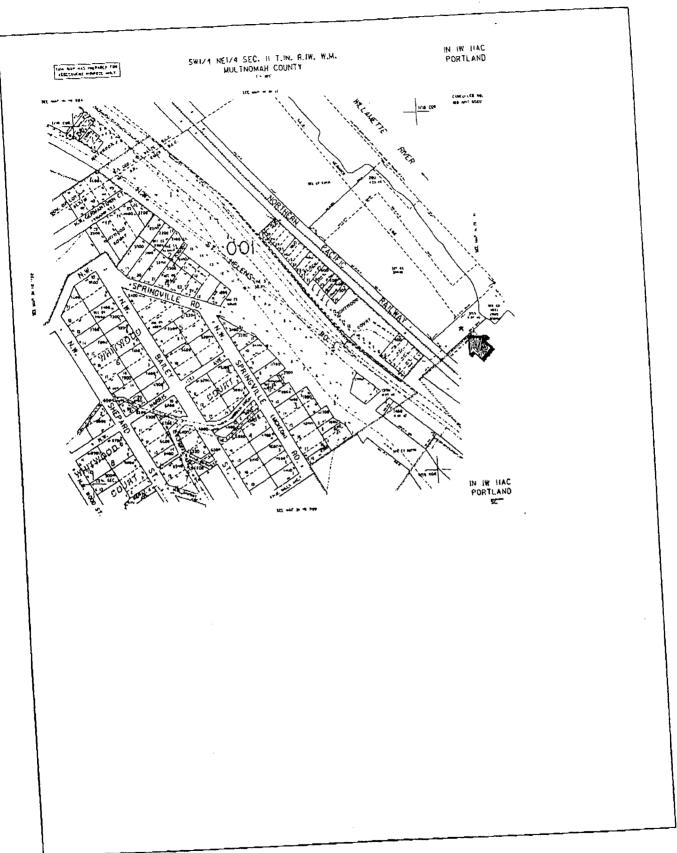
: Various Imps



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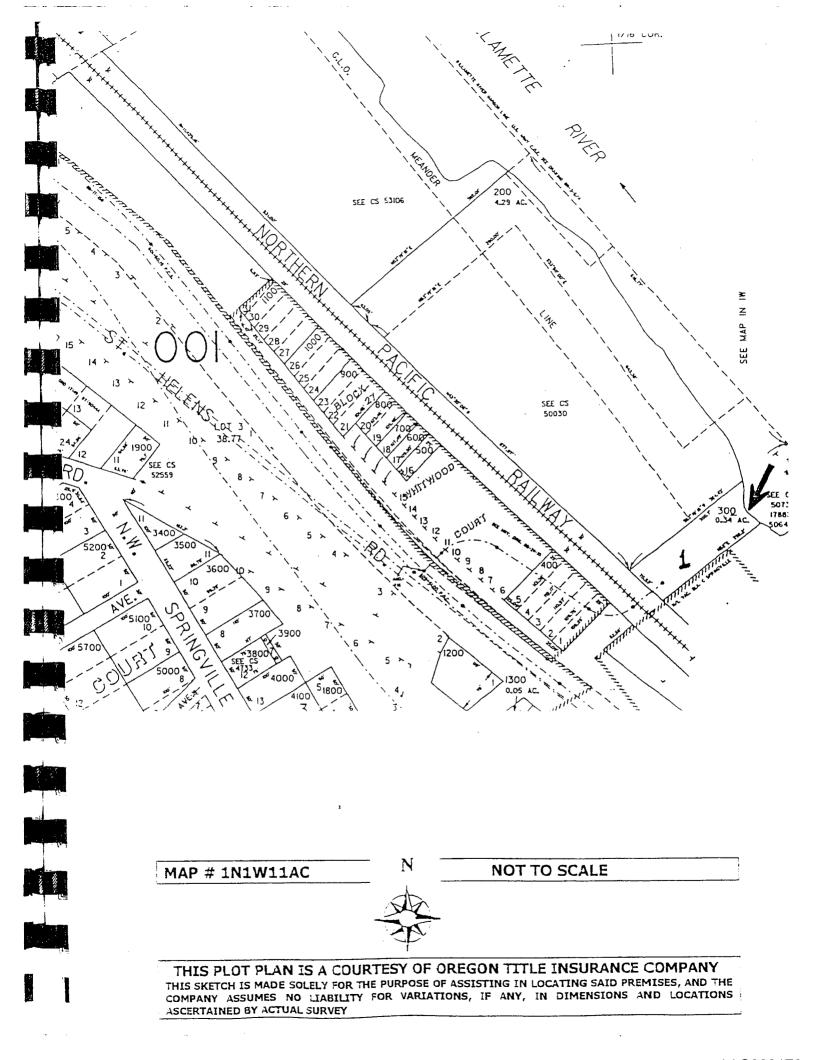


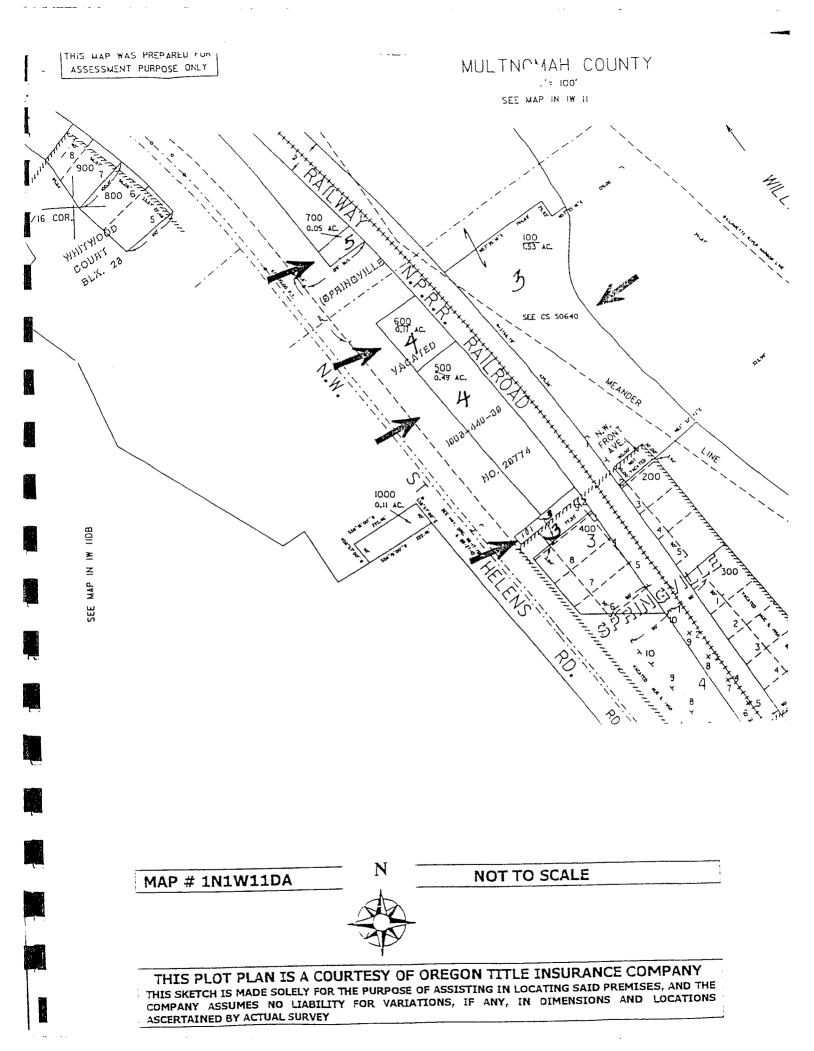


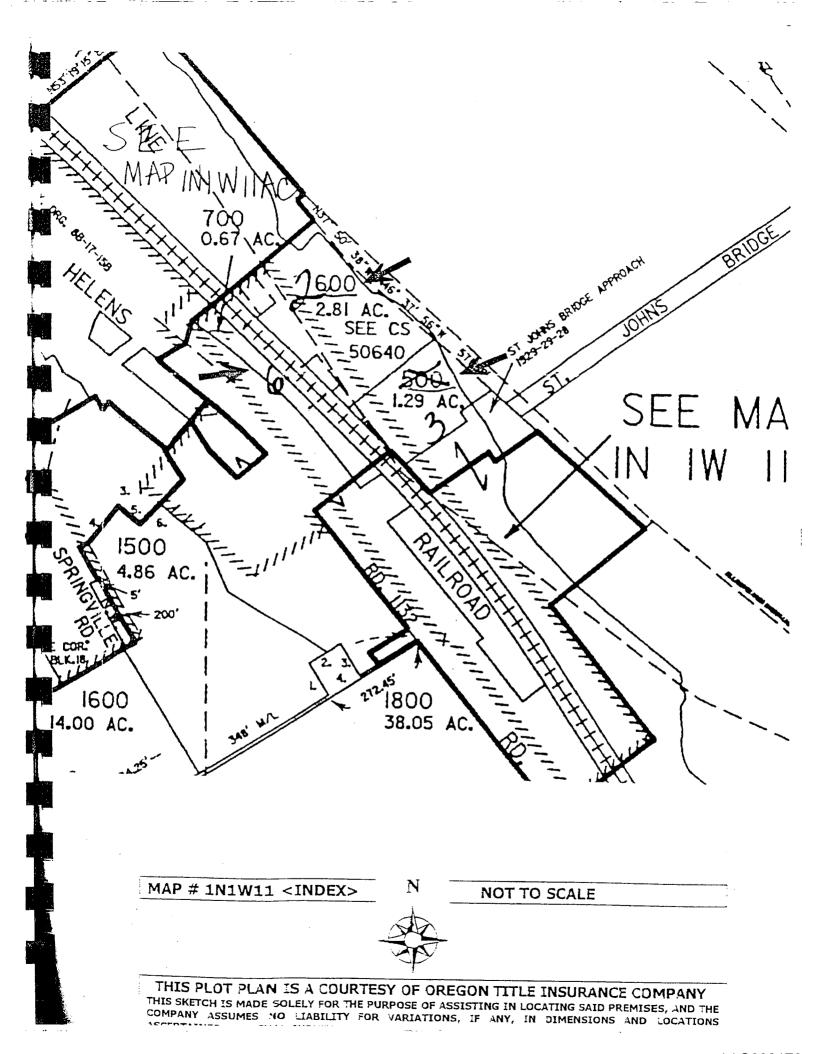
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State of Oregon Department of Environmental Quality

Preliminary Assessment and Expanded Preliminary Assessment Work Plan

Marine Finance Site Portland, Oregon REVISED FINAL

July 2000

ODEQ Task Order No. 90-97-15 Jacobs Project No. 05-V822-00

Prepared by:



1527 Cole Blvd., Bldg. 2 Golden, CO 80401 (303) 462-7000

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Appendix B Vista Information Solutions, Inc. - Site Assessment Report

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Appendix D Health and Safety Plan

ACRONYMS

amsl above mean sea level

ASTM American Society for Testing and Materials

BES Bureau of Environmental Services

bgs below ground surface

BPA Bonneville Power Administration

CERCLIS Comprehensive Environmental Response, Compensation, and Liability Act

Information System

cm centimeter

DEQ Oregon Department of Environmental Quality

DQO data quality objectives

DRO diesel range organics

DPT direct push technology

ECSI Environmental Cleanup Site Information

ERNS Emergency Response Notification System

eV electron volt

GRO gasoline range organics

HCID hydrocarbon identification

HOT heating oil tank

HPAH high molecular weight polynuclear aromatic hydrocarbon

HSP health and safety plan

IDW Investigation derived waste

Jacobs Engineering Group Inc.

LPAH low molecular weight polynuclear aromatic hydrocarbon

LUST leaking underground storage tank

ml milliliter

MS/MSD for matrix spike/matrix spike duplicate

NAVD North American Vertical Datum

NPL National Priority List

NWTPH-Dx diesel and heavy hydrocarbons range

OAR Oregon Administrative Rule

ODOT Oregon Department of Transportaion

ORS Oregon Revised Statutes

PA	preliminary assessment
PBSE	PBS Environmental
PCB	polychlorinated biphenol
PID	photoionization detector
POL	petroleum, oils, and lubricants
PPE	personal protective equipment
ppm	parts per million
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RM	River Mile
RPD	relative percent difference
SDG	sample delivery group
SOP	standard operating procedure
SPA	safe plan of action
SSSA	Soil Science Society of America
SVOC	semivolatile organic compound
TBT	tri-butyltin
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TSD	transportation, storage, and disposal
USCG	U.S. Coast Guard
USCS	Unified Soil Classification System
UST	underground storage tank
USACE	United States Army Corp of Engineers
USEPA -	United States Environmental Protection Agence
VOA	volatile organic analysis
VOC	volatile organic compounds
XPA	expanded preliminary assessment

1.0 INTRODUCTION

This Preliminary Assessment (PA) and Expanded Preliminary Assessment (XPA) Work Plan presents both a summary of known current and historic site operations and investigations as well as a work plan to collect data to better support a determination of whether the Marine Finance site has released hazardous substances to the environment and poses a threat to human health and/or the environment. Specifically, this document includes an evaluation and interpretation of current and historical site information, site reconnaissance information, a physical description of the site, identification of potential contaminant source areas, discussion of potential contaminant migration pathways and potentially affected media, sampling objectives, the rational for the proposed sampling locations, a detailed description of the field activities and methodologies for soil, water, and sediment sampling, analytical sampling schedule, investigation derived waste (IDW) management, site-specific health and safety plan (HSP), and analytical and quality assurance/quality control (QA/QC) requirements to assure that XPA data are sufficient for future site characterization and risk assessment, if required. The PA section of this document is based on available site data, previous investigations, file searches, data obtained from sources of public record, site reconnaissance, and interviews with site employees.

A PA is required by Oregon state law at sites where a significant threat to human health or the environment is suspected from a release of hazardous substances (as defined in Oregon Revised Statutes (ORS) Chapter 465.200). Authority for conducting a PA is provided in ORS 465.245 and Oregon Administrative Rule (OAR) 340-122-072. A PA is designed to determine whether a site is releasing, has released, or could release hazardous substances to the environment and whether a response action is required. The objectives of a PA include identification of potential hazards at a site, identification of areas at a site that require immediate action, and establishment of priorities for areas on a site requiring further investigations. This PA was designed to investigate chemical and waste handling practices, and to evaluate potential contaminant migration pathways, including surface water, sediment, air, and groundwater, for hazardous chemicals that may have been released to the environment from operations at the Marine Finance site.

An XPA is considered necessary to determine if a release has occurred or may occur that could endanger human health or the environment. This document includes a work plan for an XPA. This is not intended to be a full investigation or characterization of the site. The scope of this document and study includes review of available file information, interviews during an on-site reconnaissance inspection, a comprehensive target survey, and limited groundwater, soil, and sediment sampling.

This PA/XPA is conducted under the Oregon Hazardous Substance Remediation Action Fund, while the Oregon Department of Environmental Quality (DEQ) determines the eligibility of the site for Orphan Site account. The Orphan Site account was created to investigate and clean up

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hazardous substance contamination at high priority sites where the responsible party is unknown or is unwilling or unable to undertake the required removal or remedial actions (ORS 465.381). The Orphan Site Account is available for funding the investigation, stabilization, or cleanup of declared orphan sites.

As discussed further in this report, the site is within a 6-mile stretch of the Lower Willamette River where the U.S. Environmental Protection Agency (USEPA) conducted a sediment study in 1997 (USEPA 1998). The study area, situated between the upstream ends of Sauvie Island and Swan Island, is referred to as the Portland Harbor. One of the subsurface sediment samples collected during this study adjacent to the Marine Finance facility exceeded Portland Harbor baseline values for 12 analytes as discussed further in Section 2.2.1.

In a January 1998 spill report, the U.S. Coast Guard (USCG) observed numerous drums of oily rags, antifreeze, etc., with housekeeping and storage concerns at the Hendren Tow Boat site (PBS Environmental (PBSE) 2000). DEQ issued a Strategy Recommendation on 27 September 1999 (Oregon Department of Environmental Quality (ODEQ) 1999a). DEQ has determined that a PA/XPA is required for the site as a result of this and the sediment study results.

1.1 PURPOSE

The purpose of this PA/XPA Work Plan is to review available site information and outline the essential field activities necessary to determine whether hazardous substances have been released or are a threat for release from the site and have been transported to Willamette River sediment. Further, this XPA Work Plan identifies existing information gaps and recommends field sampling activities necessary to fill in those information gaps.

Seven exploratory probes are proposed using direct push technology (DPT) techniques to collect five soil samples and seven groundwater samples for chemical analysis. Additionally, 11 locations are proposed for surface soil sampling, six locations are proposed for sediment sampling, and two locations are proposed for surface water sampling. Groundwater samples will be collected using temporary well point techniques.

1.2 REPORT ORGANIZATION

The PA/XPA Work Plan has been organized into the following sections:

- Section 1.0, Introduction. This section describes the purpose and administrative requirements of the XPA Report.
- Section 2.0, Site Background. This section contains a description of the site as well as
 background information on ownership and operational history, regulatory history at the
 site, and results from previous investigations.

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- Section 3.0, Source Areas and Waste Characterization. This section identifies potential sources on and off the site and provides information to support further evaluation of their plausibility as sources to sediments near the site. A summary figure is presented with sources and transport mechanisms. The figure is used to summarize the sources and their initial screening as potential impacts to sediments.
- Section 4.0, Pathways of Exposure. This section evaluates the potential contaminant and exposure pathways for groundwater, air, surface water and sediment, and direct contact.
- Section 5.0, Proposed Site Sampling Activities. This section describes the site sampling activities proposed to determine whether hazardous substances have been released or threaten to be released at the facility.
- Section 6.0, Sampling and Analysis Program. This section describes the field sampling procedures and analytical methods proposed to determine the presence of the contaminants of concern.
- Section 7.0, Quality Assurance Plan. This section describes the testing and analytical
 procedures for the investigation, including data quality objectives, sample collection and
 quality control procedures, analytical quality control procedures, data quality
 management, and quality assurance oversight.
- Section 8.0, Health and Safety Plan. This section presents the health and safety practices, personal protective equipment (PPE) requirements, emergency notification, and spill response and reporting for the project.
- Section 9.0, Reporting. This section presents the reporting requirements for the results of the field investigation.
- Section 10.0, Schedule. This section presents the schedule for the field work and reporting.
- Section 11.0, References. This section presents the citations for all documents used in preparation of this report.

Appendices include:

- Appendix A, Historical Aerial Photographs. This appendix presents representatives historical photographs of the site and areas immediately adjacent.
- Appendix B, VISTA Information Solutions, Inc. Site Assessment Report. This appendix presents the Site Assessment Report for Marine Finance.
- Appendix C, Online Information Sources. This appendix presents the data obtained from various online information services.
- Appendix D, Health and Safety Plan. This appendix presents the safe plan of action for the specific work to be preformed.

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2.0 SITE BACKGROUND

This section presents a brief description of the site, the ownership and operational history, as well as the regulatory history. This information was collected from a variety of sources including DEQ files, previous reports, site reconnaissance, online resources, and a VISTA Report. The site is referred to as the Marine Finance site throughout this report, but the site has also historically been identified as the Riverside Industrial Park, the General-Knapton Road Site, and the West State, Inc. site.

2.1 SITE DESCRIPTION

The Marine Finance site is located along the western edge of the Lower Willamette River in Portland, Oregon (Figure 2-1). The St. Johns Bridge extends over the center of the property and therefore divides the site into a northern section, which is approximately 2/3 of the total site area, and a southern section, which is approximately 1/3 of the total site area (Figure 2-2). This document therefore refers to the northern and southern sections of the property using the St. Johns Bridge as the dividing line. The region around the site is characterized by heavy industry along the river and a mix of residential, commercial, industrial, and recreational properties west of St. Helens Road. The following summarizes the site location and ownership:

GENERAL SITE DATA

Site Name and Address:

Marine Finance

8444 Northwest Saint Helens Road Portland, Oregon 97231-1115

Current Owner(s):

Marine Finance Corporation 8444 Northwest Saint Helens Road Portland, Oregon 97231-1115

Note: The February 2000 Phase One Environmental Assessment Update was prepared for a company called Capital Consultants, 2300 S.W. First Avenue, Portland,

Oregon 97201 (PBSE 2000)

Current Operators (Tenants):

Transloader International, Hendren Tow Boat Company, Mark Even Construction, Black Cat Studios, NW One

Design.

Site Contact(s):

Mike Williams

Latitude:

N 45° 35'

Longitude:

W 122° 46'

Legal Description:

The facility is located in the northeast quarter of the southeast quarter of Section 11 Township 1N, Range 1W, (Willamette Meridian, 01N01W11DA), Lots 100, 500, and

600, approximately 9.7 acres.

Directions to Site:

Located northwest of the city of Portland, beneath the southwestern end of the St. John's Bridge over the

Willamette River.

2.2 OWNERSHIP AND OPERATIONAL HISTORY

The site is currently used for office trailer storage, warehouses, an art studio, tow boat operations, sailboat construction, and houseboat construction according to information provided by representatives from Marine Finance Corporation to DEQ on 02 March 1999. Structures at the site currently consist of two large metal-clad Quonset huts on concrete slabs, a wood-frame modular office building, a small metal-clad trailer house, a small wooden shed, a floating-home builder's dock, as well as a gangway and floating facilities owned by a tow boat company. A concrete slab foundation from a former warehouse building in the southern portion of the property may still exist in part or in its entirety under some overlying soil. There are currently two docks onsite north of the St. John's Bridge. The site is currently occupied by five businesses which all lease space on a month-to-month basis:

- Transloader (Transversal) International Import/Export business. Transloader International
 occupies a trailer for its office operations and the south Quonset hut for warehousing of
 merchandise.
- Hendren Tow Boat Company Tugboat business. Hendren Tow Boat Company operates on Marine Finance property south of the St. John's Bridge. Since Hendren Tow Boat started operations at the site in 1993, it has been used as a tug boat dock. There are currently several floating structures/docks in the river adjacent to the site. Maintenance of its vessels is performed onsite.
- Mark Even Construction Houseboat construction. Mark Even Construction constructs houseboats on the shoreline of the Willamette River using a dock at the northern end of the property and has support operations and material storage in the adjacent area.
- Black Cat Studios Sculptors studio space in the northern end of the north Quonset hut.
- NW One Design Sailboat construction in the southern end of the north Quonset hut.

The history of the site was traced by PBS Environmental (PBSE) in a 1993 Phase One Report (PBSE 1993), back to 1926 by means of aerial photographs, Portland City Directories, Sanborn Fire Insurance maps, City building records, and personal interviews. In summary, the report states that the property had been used by various marine construction companies and tow boat/barge companies since the 1920's or earlier. In the past the site also had a modest warehouse in the southern portion of the site as well as smaller buildings, such as office buildings, a tavern, and a private residence. Between 1936 and 1940 the area was built up with fill material. The present day Quonset huts were constructed sometime before 1957. Much of the site was leased to two metal salvage companies from 1988 until 1993. PBS states in the 1993 report that during its site visit scrap metal covered much of the storage yard, and that direct observation of the ground surface was difficult (PBSE 1993).

In 1926, the south parcel was occupied by Jacobsen Construction Company. Activities conducted by Jacobsen included pile driving, dock work, and bridge building. Jacobsen had an equipment warehouse with an office and tool room in the south end of the parcel, located

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between the river and the railroad tracks. This building was serviced with electric power, stove heat, and city water. The historic aerial photographs depict this structure (Appendix A). Toilets and basins drained directly into the river. A dock and an overhead crane was located south of the warehouse. The adjacent property to the south was occupied by government moorings (PBSE 1993).

At the same time on the north parcel near the present location of Mark Even Construction, a cross-river ferry slip and landing was present. The ferry apparently operated until approximately 1932 when the St. Johns bridge was constructed. The Claremont Tavern, which was later renamed the Thomas Roadhouse, was present near the intersection of the ferry landing road and the railroad tracks. A private dwelling and garage appeared just south of the bridge between the railroad tracks and St. Helens Road in 1932. Jacobsen continued to occupy the remainder of the south parcel. Houseboats occupied the shoreline on the north parcel.

By 1943, the south parcel was occupied by Portland Tug and Barge, which was owned by Jacobsen Construction. The equipment warehouse remained, and a new one-story office building was constructed on the north parcel and connected to the sewer.

A 1948 aerial photo shows that fill had been placed on the north parcel, bringing it to close to its present day elevation (Appendix A). The U.S. Army Corps of Engineers (USACE) has no records of fill disposal from river dredgings on the property, which indicates that the fill material was likely obtained from private dredging operations (PBSE 1993). The 1948 aerial photo shows two elongated buildings, which appear to be warehouses, side-by-side in the center of the north parcel. In 1951, a temporary restroom was constructed on the property which was connected to a septic tank (PBSE 1993).

General Construction Company purchased the property from Jacobsen Construction Company in approximately 1953. The address for Portland Tug & Barge (8444 N.W. St. Helens Road) was listed as vacant starting in 1953 until 1957. At approximately this time, the Corps of Engineers occupied the government mooring property to the south. The present-day Quonset huts were constructed before 1957 based on review of the aerial maps (Appendix A) although the PBSE report indicates construction in 1959 (PBSE 1993). The original warehouse on the south parcel was demolished in October of 1965.

In 1972, a permit was filed by General Construction Company with the City of Portland for the grading, surfacing, and fencing of storage areas, and construction of dolphins, floats, ramps, and an oil storage building for lubricants and greases. Precise locations are uncertain, but several ancillary structures are present on the east sides of both Quonset huts in the 1972 aerial photograph that were not present in the 1971 aerial photograph (Appendix A). Additionally, much additional storage east of the Quonset huts and on the southern portion of the property is noted in 1972. Later that year, an office trailer was added on the north parcel. In 1979, a sewer

connection permit was filed by General Construction for a trailer on the south parcel (PBSE 1993).

The property was purchased from General Construction in 1988 by West State, Inc. West State intended to use the site for shop repair, however that never occurred. The buildings and property were leased in 1989 to Clydes Ferrous Metal Salvage whose office space was in the south half of the north Quonset hut, and Abrams Scrap Metal whose office space was in the south Quonset hut. Scrap metals were stored in the area east of the Quonset huts. A diving and construction company called Dutra Devine occupied the north end of the north Quonset hut and the modular office building near the north dock. Prior to Dutra Devine, the north end of the north Quonset hut was occupied by Western Boiler Repair.

Three underground storage tanks (UST) located immediately east of and adjacent to the southern Quonset hut (Figure 2-2), which were previously used by General Construction Company, were removed from the site in 1988 immediately after the purchase of the property by West State, Inc. (Dames & Moore 1988). Two USTs, a 20,000-gallon and a 10,000-gallon tank, stored diesel fuel and the third, a 5,000-gallon UST, contained gasoline. A fuel pumping island was located near the USTs by the southern Quonset hut. A fuel line also led to the dock north of the St. Johns Bridge and may have supplied fuel for river vessels and/or been a supply line for the USTs. Contaminated soil was excavated from the tank pits to depths of 15 to 26 feet below ground surface (bgs). Additional test pits were dug along the former route of the product lines, and more contaminated soil was removed. The removal project received a "No Further Action" letter from the DEQ in February 1989.

2.2.1 Previous Investigations

The site is located adjacent to River Mile (RM) 6.0, which is within a 6-mile stretch of the Lower Willamette River where the USEPA conducted a sediment study in 1997 (USEPA 1998). The USEPA sediment study area, situated between the upstream ends of Sauvie Island (RM 3.5) and Swan Island (RM 9.5), is referred to as the Portland Harbor. This study included collection of 187 near-shore sediment samples from either shallow (6 to 17 cm), or deep (55 to 139 cm) sediments. Most of the samples (150) were collected from the shallow horizon. All samples were analyzed for total metals, semi-volatile organic compounds (SVOCs), total organic carbon (TOC), and sediment grain size. Selected samples were also analyzed for organotins (specifically tributyltin (TBT)), pesticides, polychlorinated biphenols (PCB), chlorinated herbicides, and chlorinated dioxins and dibenzofurans (ODEQ 1999b, USEPA 1998).

One of the subsurface sediment samples (SD055-C) was collected adjacent to the Marine Finance site from a depth of 0 to 90 cm. Another shallow sediment sample (SD055) was collected downstream, and both a shallow (SD057) and subsurface (SD057-C) sediment sample was collected upstream of the Marine Finance site. The results exceeding the Portland Harbor

Sediment Baseline Maximum Value included copper, lead, mercury, nickel, zinc, 2-methylnaphthalene, benzoic acid, carbazole, dibenzofuran, total low molecular weight polycyclic aromatic hydrocarbons (LPAHs), total high molecular weight polycyclic aromatic hydrocarbons (HPAHs), and TOC (Table 2-1). The Marine Finance sample exceeded baseline values for 12 analytes, while the two upstream samples (SD057 and SD057-C) exceeded baseline values for two and four analytes, respectively. The downstream sample did not exceed the baseline values for any of the analytes (ODEQ 1999b). The two nearby upstream sites which are currently undergoing cleanup are the U.S. Moorings Site, and the Gasco Site (ODEQ 1999b).

The Level One (Phase One) Environmental Property Assessment Report (PBSE 1993) referenced in Section 2.2 was updated in 2000 (PBSE 2000). The 1993 report found that various items stored in the yard presented potential sources of contamination, such as empty drums taken in as salvage which once contained hazardous material, as well as electrical transformers and metal shavings. The report recommended that a visual assessment be conducted in the storage yard after Abrams Scrap Metal vacated the site to determine whether any hazardous materials may have been released on the property. The 2000 report stated that the bulk of the scrap metal in the yard had been removed, but that a large number of small pieces of plastic and metal were present within the surface soils of the former metal salvage storage yard.

2.2.2 VISTA Site Assessment Report

A Site Assessment report was ordered from VISTA Information Solutions, Inc (Vista Information Solutions, Inc. (VISTA) 2000). A copy of the report is included in Appendix B. A VISTA Site Assessment Report is a service which, given a property address, summarizes the possible sources of waste near a given site. The VISTA report for the Marine Finance site identified any nearby National Priority List (NPL) sites, Resource Conservation and Recovery Act (RCRA) Corrective Action and associated Treatment, Storage and Disposal (TSD) facilities; State Equivalent Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) sites, sites currently or formerly under review by USEPA, RCRA permitted TSD facilities, Leaking Underground Storage Tanks (LUST), sites permitted as solid waste landfills, incinerators, or transfer stations; registered USTs, Emergency Response Notification System spills (ERNS), RCRA registered small and large generators of hazardous waste, and the State spills list.

One LUST site within 1/4-1/2 mile of Marine Finance is a heating oil tank (HOT) owned by J. Illias, and is listed as having been closed in 1998. Three other sites were identified, but have no information regarding the type of LUST, are located on the opposite side of the Lower Willamette River, and are listed as having been closed in 1989 or 1990: Riverside Lumber Company, Stenno Carbon Company, and BBS Property.

There is one UST site comprising three USTs listed within 1/8-mile of Marine Finance, which are presumably the three USTs formerly present at the Marine Finance site. The Vista Report lists the USTs as owned by REH, Inc., although the site was owned by West State, Inc. at the time of the tank closure and no other reference to REH, Inc. has been identified. The tank status of all three tanks is listed as closed.

The three USTs were removed and soil samples collected (Dames & Moore 1988). The soil confirmation samples collected from the UST excavations showed total petroleum hydrocarbon (TPH) concentrations below tanks 1 and 2, which each stored diesel fuel, of 5900 parts per million (ppm) and 2200 ppm respectively. The clean up standards in effect at the time were applied on a case-by-case basis and therefore a "clean up" criteria of 100 to 1,500 ppm TPH in the soils was suggested by the DEQ for the site. Contaminated soils were removed from the UST locations until TPH levels in the soil were acceptable to the DEQ. On 17 February 1989 DEQ issued a No Further Action Letter to West States, Inc. (PBSE, 1993).

The VISTA report also indicates that there are three sites within 1/8-mile, and another three sites within 1/4 - 1/2 mile of the Marine Finance site which are on the State Equivalent CERCLIS list (DEQs Environmental Cleanup Site Information (ECSI)). The three sites located within 1/4-1/2 mile: City of Portland Bureau of Environmental Services (BES) Water Pollution Control Laboratory, Mar Com Incorporated, and Crawford Street Corporation are located on the opposite side of the Lower Willamette River. The sites located within 1/8-mile of the site are Marine Finance Corporation, Transloader International Company, and the Doane Lake Study Area.

2.2.3 Historical Aerial Photographs

Historical aerial photographs were obtained from the Oregon Department of Transportation (ODOT) and the USACE (Appendix A). Photographs available from ODOT were taken in: 1958, 1966, 1971, 1981, and 1993. Photographs available from USACE were taken in: 1936, 1940, 1957, 1961, 1972, 1980, 1991, and 1998.

Logging operations adjacent to the site on the Willamette River are visible in the aerial photographs from 1936, 1940, 1957, 1958, 1961 and 1966. Scrap metal operations are visible east of the Quonset huts in the aerial photographs from 1972 and 1993 (Appendix A). The parcel to the northwest of the site was used as some type of storage in the 1980, 1981 and 1991 aerial photographs. Based on inspection of the aerial photographs, the following observations were made regarding changes to the Marine Finance site in addition to those reported in Section 2.2.1:

• In 1936, the rectangular building south of the bridge, which was used by Jacobsen Construction Company and later General Construction, was already present and the edge of the Willamette River was almost up to the railroad track. Logging operations were present on the water both south and north of the bridge. Various floating structures are present on the water.

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- In 1940, the edge of the Willamette River is significantly further away from the railroad track. It is difficult to tell if this change is solely due to a lower water level in the Willamette river, or to landfilling, or both. Logging operations and various floating structures are still present on the water.
- By 1957, numerous structures have been added to the site. These include the two Quonset
 huts and several smaller structures in the yard area. A large boat and two crane barges are
 present in the area south of the bridge. The 1958 and 1961 photos show much the same
 operations.
- In 1966, there are no boats or barges present in the area south of the bridge, but the area is occupied by floating logs. Some of the smaller structures in the yard area have been removed as well as the original rectangular building present in the 1936 photo (the warehouse used by Jacobsen Construction Company and General Construction). The warehouse was demolished in 1965 as noted in Section 2.2. There is also significant earth moving taking place in the yard area and along the shoreline.
- In 1971, virtually no water operations are present at the site. The foundation area of the former warehouse building is used as a storage area. The yard area is relatively clear other than a few piles of material north of the bridge, across from the north Quonset hut.
- By 1972, the site has significantly changed. The yard area has been leveled, the shoreline
 has been extended, and rip rap has been added for stabilization. Numerous piles of material
 are located throughout the yard area underneath and to the north of the bridge. The indented
 shoreline south of the bridge near the present-day Hendren Tow Boat has been straightened.
- In 1980, the yard area is clear again and there is a significant boat/barge operation south of the bridge. Also, the formerly unused area to the north of the Marine Finance site is used for material storage. There is a driveway directly between the two operations.
- In 1981, numerous boats and crane barges are present in the water, the yard area has some material storage, and the adjacent property to the north is still used as a storage area.
- By 1993, the site has several large barges and the yard area is used for storage. The adjacent property to the north does not appear to be occupied. The floating "island" operations used by Hendren Tow Boats is established.
- In 1998, numerous buildings have been added to the site in the yard area and along the water.

2.2.4 Site Reconnaissance

John Zimmerman of Jacobs Engineering Group Inc. (Jacobs) performed a site reconnaissance at the Marine Finance site with Rodney Struck of DEQ on 22 March 2000. The following site information was noted:

- Limitations imposed by physical obstructions that may hinder field activities;
- Presence of overhead utilities;
- Evidence of past contaminant releases; and
- Possible pathways for contaminant release and migration.

Jacobs/DEQ personnel met with Marine Finance representatives on Wednesday, 22 March 2000 to obtain information about past and current hazardous material handling practices and any knowledge they may have regarding past releases. Limited historic information was provided by Marine Finance personnel. During site reconnaissance, Jacobs/DEQ personnel were escorted by Marine Finance site property manager Mike Williams and site manager Darrel Andrews.

During the site reconnaissance visit the following general observations were made:

- A seep was observed in the northern portion of the site, near the former ferry landing. The seep emerges from the ground and creates a small area with standing water approximately 2 to 3 feet across. Discarded carboys, miscellaneous materials, and soil staining were noted in the area upgradient of the seep.
- A pipe was observed discharging water in the area near the former ferry landing. The pipe is believed to capture infiltrated water from the northern portion of the site as well as the property to the north of Marine Finance. Poor housekeeping and soil staining were noted in the area believed to be drained by this pipe. Historic material storage has occurred in the area as well.
- Surface soil staining was observed in several areas of the yard. The color of the staining ranged from dark gray to brown in areas from as little as 1 square foot up to 20 square feet.

 A stained area was also observed to the east of the north Quonset hut.
- Numerous apparently abandoned drums and other containers were observed in several collection areas on the property. The largest collections of containers were observed in the southern portion of the site. Some containers appeared to be leaking, but no labels identified the potential contents. Miscellaneous materials storage was noted near the southwest corner of the property outside of the security fence. This area has been identified as a popular dumping area (PBSE 1993).
- Surface markers for a buried petroleum pipeline were found adjacent and parallel to the
 access road west of the Burlington-Northern Railroad tracks outside of the property security
 fence. The pipeline is a high-pressure line buried 40-inches bgs and used for both gasoline
 and diesel fuels. It is owned by Olympia Pipeline Company of Renton, Washington. Leaks
 from this pipeline would be readily apparent because it is under high-pressure (PBSE 1993).

2.3 REGULATORY HISTORY

Four regulated actions associated with the site are known: (1) removal of the three USTs as discussed in Section 2.2; (2) one time disposal of abandoned paint waste; (3) a USCG spill report; and (4) a DEQ Strategy Recommendation. Information available for these activities includes:

- In 1988, the three USTs were decommissioned as discussed in Section 2.2.
- One time disposal of abandoned paint waste from a "dumping area" dated 20 March 1997 is reported, but the site's 1997 hazardous waste generator Annual Report indicates that the facility no longer generates hazardous waste (PBSE 2000).

- In a January 1998 spill report, the USCG observed numerous drums of oily rags, antifreeze, etc., with housekeeping and storage concerns at the Hendren Tow Boat site (PBSE 2000).
- DEQ issued a Strategy Recommendation on September 27, 1999. On January 25, 2000 DEQ issued a letter to Mr. Doug Watson of Astoria Metals Corporation giving notice of its intention to perform a PA at the Marine Finance site (PBSE 2000).

2.4 SITE TOPOGRAPHY

The Marine Finance site is located on the western bank of the Willamette River. The property is flat to gently sloping toward the river. An embankment with rip rap drops sharply to the water approximately 20 feet from the river edge. A gully is located in the northeast corner of the site. The offsite area to the west of the site slopes up steeply toward St. Helens Road and beyond to a small housing community west of the site. As noted in Section 2.2, fill material, rip rap, and land contouring have changed the original topography of the site, but all stormwater runoff has flowed and continues to flow toward the river. The actively used areas of the site have limited vegetative cover and mostly comprise road base materials. The offsite areas are well vegetated.

2.5 GEOLOGY AND HYDROGEOLOGY

The Marine Finance site is constructed on what is likely a combination of fill material and natural terrace deposits created by the Willamette River. Fill material has been noted to a depth of approximately 23 feet bgs in the area east of the Quonset huts (Dames & Moore 1988). The terrace deposits overlie alluvium of the Willamette River basin unconformably. Both of these deposits are of Pleistocene age and are composed of indistinguishable unconsolidated stratified sand and silt. The sand ranges from very coarse to very fine, but is predominantly fine to very fine (Trimble 1957). The thickness of the terrace deposits at the site is approximately 10 feet thick while the alluvium deposits are known to have a maximum thickness of 100 feet (Trimble 1957). Columbia River basalts are believed to underlie these alluvial deposits at various depths near the site. Lacustrine deposits consisting of unconsolidated boulders, gravels, sand, and silt with a thickness on the order of hundreds of feet lie beneath the alluvium deposits. The Pliocene Troutdale formation typically underlies the alluvial deposits in the region and consists of conglomerate, sandstone, shale, and mudstone. The thickness of the Troutdale formation ranges from zero to more than 1,100 feet.

Comparison of aerial photographs from 1938 and 1940 and from 1961 and 1972 indicates that a significant amount of fill material had been added to the site during both of these periods. As noted in Section 2.2, the USACE has no record of dredge material from the Willamette River being used as fill material onsite, indicating that the fill material was likely obtained from private dredging operations or another offsite source.

Based on static water levels reported in nearby monitoring wells and geotechnical holes, groundwater is expected to be encountered between 20 and 25 feet bgs (Oregon Water Resources Department 1999).

2.6 GROUNDWATER WELLS AND WATER USE

The Oregon Water Resources Department's GRID database was accessed to determine the locations of groundwater monitoring and water supply wells within the same Township, Range and Section as Marine Finance. Marine Finance is located in the east half of Section 11, Township 1N, Range 1W, but the search area included all of Section 11 (Appendix C).

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3.0 SOURCE AREAS AND WASTE CHARACTERISTICS

Potential and documented sources that may have affected surface and subsurface soils, sediment, surface water or groundwater quality at the site are presented in this section. Waste characteristics associated with those site sources are discussed with regard to the potential to affect sediments adjacent to the site in the Willamette River, as well as soils and groundwater at the site that may effect these sediments.

The following areas could be sources of contamination and most will be investigated during the XPA. However, several areas of orphan drum and materials storage, stained soil and stressed vegetation, areas with poor housekeeping, and other potentially questionable areas are not included within the scope of this XPA but may require investigation in the future. The areas with the greatest likelihood of impact to the Willamette River are prioritized for investigation as indicated in Section 5.0.

3.1 ONSITE SOURCES

3.1.1 Former Underground Storage Tanks and Piping

The tank remediation investigation associated with the underground storage tank removal was conducted in a manner consistent with standard practices at the time. However, the USTs and associated piping may have adversely affected the subsurface soil or groundwater in locations not detected during the tank remediation investigation. Only limited sampling was performed to clean-close the USTs under an ad hoc determination as discussed in Section 2.2.1. Also, the data from the sampling was not available for review and/or validation to assess the data quality and usability. Hazardous substances potentially associated with this source area include diesel and gasoline stored in the former USTs.

3.1.2 Hendren Tow Boat Operations Area

Hendren operates and maintains a fleet of tow boats from their floating dock on the south end of the site. Hendren's office is also located on the floating dock. The nature of the operation indicates that a number of lubricants, fuels, hydraulic oils, anti-freeze, paints and antifoulant biocide paints, solvents, and other maintenance materials, may be used and might be stored on the floating dock. This was reflected at least in part by the January 1998 spill report of the USCG inspection and the March 2000 site visit. The abandoned drums and other containers observed on the southern portion of the site could also belong to the tow boat operation, although ownership and responsibility for these materials is not known. The area of the former warehouse is also a potential source area because material storage on the foundation was noted on the aerial photographs (Appendix A). The foundation of this building may still periodically serve as a

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storage area. Therefore, the contaminants of interest in this are primarily petroleum and solvents, but could also include paints, TBT, metals, and herbicides associated with the site.

3.1.3 Scrap Metal Operations

At least two scrap metal salvage companies have operated at the site as discussed in Section 2.2. Both ferrous and non-ferrous scrap metals were stored in the yard area. The types of salvage materials stored onsite included steel tanks and other vessels, heavy equipment and other machinery, metal shavings and scraps, and empty steel drums (PBSE 1993). Some of the empty drums were labeled for waste oil, pesticides, and lubricating oils. Abrams Scrap Metal Company received scrap electrical transformers from Bonneville Power Administration (BPA), although Abrams reportedly received documentation from BPA that all of the transformers had been drained of fluid and contained no PCBs. Other salvaging operations are evident from the 1972 aerial photograph (Appendix A). Areas of soil staining were also noted during the site visit. Therefore, contaminants of interest in this area are primarily metals, but petroleum, solvents, herbicides, and PCB are also possible.

3.1.4 Operations In and Around Quonset Huts

The Quonset huts have been used for a wide variety of businesses since they were built which presents the possibility of illegal disposal of wastes based on general industry practices during the period. Some evidence of surface soil staining, drum storage, and poor housekeeping was observed during the site reconnaissance in March of 2000. Contaminants of interest based on the limited information available for the general industrial use of the Quonset huts include petroleum, solvents, herbicides, and PCB.

3.1.5 Mark Even Construction Dock Area

The houseboat construction operations and former uses in this area are a potential source due to the construction debris, paints/antifoulant biocide paints, stains, waterproofing agents, and other materials which may have been disposed of or released in the Willamette River or on ground surface. Contaminants of interest include petroleum distillates associated with paints and stains, organotins associated with antifoulant biocide paints, solvents used as thinners and for clean-up, and metals from waste fasteners. TOC in the sediments near this dock may be elevated from scrap wood and sawdust from historic construction activities and former logging operations.

3.1.6 Miscellaneous Drum and Materials Storage Areas

Several drum storage areas were noted during the site visit in March of 2000. Two primary drum storage areas were noted south of the bridge and historic aerial photographs indicate storage on

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the foundation of the former warehouse. Several orphan drum and materials storage or dumping sites were also noted during the site visit, such as the area outside of the fenced perimeter used by ODOT for materials storage and other unsecured areas where unauthorized disposal is possible. Contents of the drums and the type of materials stored are unknown, but the contaminants of interest are those historically associated with operations at the site, including petroleum, solvents, and herbicides. The full spectrum of contaminants is possible because some locations are not secured and any type of waste could have been disposed of.

3.1.7 Seep and Drainage Pipe

The seep and drainage pipe, which are both located in the northern portion of the site, may be venting contaminated groundwater from an upgradient area where orphan drums and soil staining were noted during the site visit. Contents of the containers and the cause of the soil staining are unknown, but the contaminants of interest are those hazardous substances associated with operations at the site including petroleum, paints and solvents, herbicides, and PCB.

3.2 OFFSITE SOURCES

Aerial photographs of the site and the surrounding areas back to 1936 have been examined for evidence of offsite sources of contamination that may have contributed to any contamination that may be found on the site as discussed in Section 2.2. Additionally, the Vista report was reviewed as discussed in Section 2.2.2 for sources of contamination near the site. No offsite sources have been identified through this review.

However, upstream sources of contamination in the Willamette River may exist as the upstream area is industrialized.

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4.0 PATHWAYS OF EXPOSURE

This section identifies and evaluates contaminant migration pathways and the potentially affected media. The potential and documented sources identified in Section 3.0 are evaluated to determine whether pathways of exposure exist for each source. Potentially affected media include Willamette River sediment and surface water, groundwater, and soil. Potential contaminant migration pathways include groundwater discharge, storm water discharge, direct release, volatilization, and dust entrainment.

4.1 GROUNDWATER PATHWAY OF EXPOSURE

Contaminants of interest, including petroleum, oils, and lubricants (POL), paints/antifoulant biocide paints, stains, solvents, herbicides, PCB, and metals, may have been released as discussed in Section 2.0 and leached into the groundwater. The groundwater may then transport the contamination to other groundwater targets.

4.1.1 Hydrogeologic Setting

The Marine Finance site is located on recent alluvium, which is comprised of silty sands, deposited in floodplains of the Willamette and Columbia Rivers. Section 2.5 discusses site geology and hydrogeology in more detail. Aerial photographs, site reports, and observations during the site visit indicate that fill material overlies native alluvial floodplain deposits at the site. The average annual precipitation for Portland, Oregon, is 95.4 cm (37.6 inches) and the estimated annual groundwater infiltration in the vegetated areas of the site is approximately 47 to 54 cm (18.5 to 21 inches).

Aquifers in floodplain deposits generally are unconfined and localized due to heterogeneity of the deposits. Columbia River basalts are believed to underlie these alluvial deposits at various depths near the site.

Groundwater is believed to flow toward the Willamette River. Most of the site is relatively flat as discussed in Section 2.4 and is approximately 30 feet above mean sea level (amsl) at its highest elevation. The site slopes down to the river to an elevation of approximately 20 feet amsl. Overland surface water flow is east toward the river.

A groundwater seep or spring is located adjacent to the Willamette River shoreline near the northern corner of the property. Water from this seep flows to the river.

4.1.2 Groundwater Targets

Vegetation and gravel cover the majority of the site. Only the structures and the St. Johns Bridge intercept precipitation. Groundwater is not used for domestic or industrial uses at the site; the site uses the municipal water supply system.

Fifty-two wells, including production wells, monitoring wells, and geotechnical wells, were identified within the search area as indicated in Section 2.6. Only two active potable water production wells were identified within a quarter mile of the site and each of the wells is upgradient of the site.

The groundwater seep and discharge from the drainage pipe are accessible to wildlife and site workers, but the site is fenced so that access to the public is limited.

4.1.3 Groundwater Conclusions

No analytical groundwater data are available for the site and no documented releases at the site are known which could have impacted the groundwater. Groundwater impacts from former and current USTs at the site have not been confirmed, but soil removal was implemented after removal of three USTs in 1988 as discussed in Section 2.2.1 (Dames & Moore 1988).

Groundwater contamination at the site may have been caused by historical incidental releases during site operations and general site usage, including leaching of metals from the former metal scrap yards, releases of POL used at tenant facilities and from the former USTs, releases of paints and solvents used by tenants, improper storage or disposal of hazardous substances, and general releases and leaching of contaminants resulting from past reports of poor housekeeping.

4.2 AIR PATHWAY OF EXPOSURE

Volatile contaminants of concern, including petroleum products and solvents, that may have been released during past operations may volatilize to the ambient air and the soil gas. Other contaminants may be transported with fugitive dust.

4.2.1 Physical Conditions

The only sources available to the air pathway is fugitive dust emissions particularly during windy conditions and volatile emissions of contaminants from the soil into the soil gas and ambient air.

4.2.2 Air Pathway Targets

The nearest air pathway receptors, other than the site workers and site workers on adjacent properties, for fugitive dust and volatile emissions to the atmosphere are the private residents west of the site. Over 100 private residences are located within a 0.5-mile radius of the site, although the majority are located to the southwest on a bluff over 100 feet above the elevation of the site. Approximately 400 people reside in this area assuming 4 people per household. The closest sensitive environment is the Willamette River adjacent to the site.

Site workers, particularly those working primarily in the structures where volatile organics in the soil gas may vent to the structures through the foundation, are potentially air pathway receptors. Volatilization to indoor air may be inconsequential depending on maintenance and operation of the facilities and their foundations, including ventilation of the structures, subsurface foundation structures, and cracks in the foundation.

4.2.3 Air Pathway Conclusions

Contaminants released at the site and residual waste, such as metal filings, may be transported through the air pathways. Metal filings and organics may be transported offsite as fugitive dust during windy conditions and may expose site workers both during windy conditions and from entrainment by vehicle traffic. Volatile organic compounds (VOC) and SVOC emissions from soil to the soil gas, which could be transported into the site structures and to the ambient air may also expose site workers and nearby residents, although exposure of local residents is unlikely because the residences are located on a bluff more than 100 feet higher than the site elevation.

4.3 DIRECT CONTACT PATHWAY OF EXPOSURE

The Marine Finance site is fenced and access is controlled, so direct contact with contaminants of concern that may have been released during past operations is primarily limited to site workers, future construction workers, and ecological receptors.

4.3.1 PHYSICAL CONDITIONS

The Marine Finance site is an industrial facility and is primarily covered with road-base material and vegetation. Riprap lines most of the shoreline.

Limited habitat exists for ecological receptors because of the industrial nature of the site. The site is secured with a cyclone type fence and access is controlled to minimize trespass. While the Willamette River bounds the site on the northeast, riprap and active tenant use may minimize trespass from the river.

4.3.2 Direct Contact Targets

The Marine Finance site is actively used by several tenants and authorized visitors. Future construction activities could include excavation for foundations and utilities during which utility trench and foundation workers could potentially be exposed to subsurface contaminants through direct contact, inhalation, or incidental ingestion. As stated above, security fencing limits unauthorized site visits.

4.3.3 Direct Contact Conclusions

Limited habitat exists for ecological receptors because of the industrial nature of the site, but sensitive ecological receptors exist in the Willamette River adjacent to the site. Areas of potential contamination on the site may pose a direct contact risk to site workers and sensitive ecological receptors.

4.4 SURFACE WATER AND SEDIMENT EXPOSURE PATHWAYS

Contaminants of concern, including POL, solvents, PCB, herbicides, and metals, may have been released as discussed in Section 2.0 and dissolved and/or eroded into the surface water that is transported from the site. The surface water may then transport suspended contaminated solids where it is deposited as sediment in the Willamette River.

4.4.1 Hydrologic Setting

The site is adjacent to the Willamette River, but the only surface water bodies on the site are a small groundwater seep and discharge from a drainage pipe near the north corner of the property. Surface water and stormwater drainage from the site and adjacent properties drain to the river.

The Willamette River has the potential to transport contaminants onto the site or to adjacent river sediments from upstream sources. The facility is within the 100-year floodplain of the Willamette River.

4.4.2 Surface Water and Sediment Targets

The site is located in an industrial area with no environmentally sensitive upland areas in the vicinity. Recreational and subsistence fishing occur within the Lower Willamette River. Commercial fishing is limited to a small Pacific lamprey fishery. Recreational boating, water skiing, swimming, and beach use also occur within the Portland Harbor area.

The Lower Willamette River provides habitat for 39 fish species, including populations of wild cutthroat trout, rainbow trout, and mountain whitefish. White sturgeon are plentiful within the

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Harbor. The Harbor is also an important migratory corridor, nursery habitat, and adult foraging area for two runs of chinook salmon, two runs of steelhead trout, and individual runs of coho and sockeye salmon. Upper Willamette River populations of chinook and steelhead, which migrate through the Harbor, are listed as threatened species under the Federal Endangered Species Act. The Pacific lamprey is considered a federal species of concern.

Great blue herons, cormorants, osprey, mergansers, kingfishers, peregrine falcons, and bald eagles routinely forage within the Harbor. The area is also part of the wintering range for the Aleutian Canada goose. All are protected under the Migratory Bird Treaty Act. The peregrine falcon is federally listed as an endangered species, while the Aleutian Canada goose is federally listed as a threatened species. The bald eagle is also a threatened species, but was recently proposed to be removed from this list.

Little data are available on the nature and extent of the benthic community within Portland Harbor sediment. However, it is known that contamination in the benthos, which is a protected beneficial use, can be the source of food-chain effects that radiate up to the species listed above, including humans.

4.4.3 Surface Water and Sediment Conclusions

Past operations at the Marine Finance site may have affected sediment quality. The site has no known stormwater outfalls discharging to the Willamette River, but stormwater runoff from the site may provide the transport mechanism. Additionally, the discharge from the seep and from the drainage pipe may provide a transport mechanism for upgradient groundwater and sediments.

4.4.4 Evaluation of Sediment

The Portland Harbor sediment study collected samples as discussed in Section 2.2.1. The sample collected adjacent to the Marine Finance site reported several analytes above the Port Harbor Sediment Baseline Maximum Value (Table 2-1). Of particular note, total LPAH and total HPAH were each almost two orders of magnitude greater than the baseline maximum value (Section 2.2.1, Table 2-1).

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5.0 SITE SAMPLING ACTIVITIES

The XPA will include activities to gather data to determine whether hazardous substances have been released or threaten to be released at the Marine Finance site and have been transported to Willamette River sediments. Activities will include collection and analysis of soil, groundwater, surface water, and sediment samples. Samples will be collected from locations that have the greatest potential to be impacted by contaminants of interest as indicated in Section 3.0 and from potential migration pathways.

Site-specific conditions, including topography, visual evidence of staining, stressed vegetation, access limitations, etc., will be evaluated and incorporated into placement of the sampling locations while in the field. New observations or information obtained in the field may also contribute to deviations from the projected sampling locations. Therefore, best professional judgment in the field will be used to select the optimal sampling locations based on projected sampling locations and the rationale reflected below.

As detailed below, five subsurface soil samples, 11 surface soil samples, seven groundwater samples, two surface water samples, and 11 sediment samples will be collected at the Marine Finance site based on the information in Section 3.0. However, samples of opportunity may also be collected based on best professional judgment in the field.

5.1 UTILITY CLEARANCES

Underground utilities will be located and marked in the area of the exploratory DPT locations prior to beginning the field investigation work. Jacobs will coordinate with Marine Finance and the Oregon Utility Notification Center to: (1) review as-built drawings of the intrusive sampling areas; (2) perform site reconnaissance with Marine Finance representatives to determine utility corridors and underground utility markers; (3) subcontract with a geophysical/utility clearance subcontractor to locate and mark underground utilities; and (4) mark known and suspected underground utilities. Finally, as a standard safety procedure, the first 5 feet of each soil exploration will be probed using a hand auger or tile probe if possible.

5.2 DPT PROBES

Five DPT exploratory probes will be conducted to collect soil samples for chemical analysis. Groundwater samples will be collected from each of these locations using temporary well points. Two additional temporary well points will be advanced for a total of seven groundwater samples. The maximum total depth to be drilled will be the lesser of either 30 feet bgs or 5 feet below first encountered groundwater. Data generated from these explorations will be used to identify contamination in soil and groundwater at the site.

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5.2.1 DPT Probe Locations for Subsurface Soil and Groundwater

This section briefly describes the locations of the DPT exploratory probes. A detailed discussion of the field procedures is presented in the Sampling and Analysis Program section (Section 6.0) including exploration methods, soil and groundwater sampling, and field screening techniques.

Figure 5-1 illustrates the approximate locations of the five proposed soil borings (SB-1 through SB-5) which will also be used for collection of groundwater (GW-1 through GW-5) in addition to GW-6 and GW-7. As indicated above, actual locations will be determined in the field based on: (1) approximate locations represented on Figure 5-1 using available landmarks; (2) best professional judgment to select a sample location that will best represent potential contamination in the area; and (3) offsetting required because of the presence of underground utilities and other obstacles (i.e. access limitations). Selected locations may require additional offsetting if refusal is encountered or if inadequate sample recovery is experienced. Final sample locations will be measured from two permanent landmarks and documented in the field logbook and on the sample collection form.

Both subsurface soil and groundwater will be collected from each DPT probe location indicated below using sample collection procedures detailed in Section 6.1.

The rationale for each exploration is described below:

- SB-1/GW-1: Located south of the St. Johns Bridge in an active drum storage area. Additionally, the northern end of the former warehouse was present in this area and the foundation was used to store unknown materials. Current contents of the drums and historic contents that may have been released from past storage are unknown but may have included POL, solvents, and paints/antifoulant biocide paints for marine vessel maintenance, and PCB from transformer storage associated with the scrap metal storage. Therefore, TPH for diesel range organics (DRO), VOC, SVOC, and metals will be tested in the soil and groundwater. PCB will also be tested in the soil.
- SB-2/GW-2: Located in the southern portion of the site where the former warehouse was located. As noted in Section 3.0, the usage of this former warehouse is unknown, but this area and the foundation were used for staging of miscellaneous materials after the warehouse was removed. Historic contents that may have been released from past storage are unknown but may have included POL, solvents, and paints/antifoulant biocide paints for marine vessel maintenance, and PCB from transformer storage associated with the scrap metal storage. Therefore, TPH for DRO, VOC, SVOC, and metals, will be tested in the soil and groundwater. PCB will also be tested in the soil.
- SB-3/GW-3: Located on the east side of the southern-most Quonset hut (the Transversal International building) near the bay door and south of the trailer. A former 5,000-gallon UST that stored gasoline and a former 10,000-gallon UST that stored diesel were removed from this area in 1988. Historic use of the Quonset hut is unknown, but releases or disposal of any hazardous substances used would likely contaminate soils immediately adjacent to the bay door. TPH (both for gasoline range organics (GRO) and DRO), VOC, SVOC, and

PCB will be collected from the soil and VOC and SVOC will be collected from the groundwater.

- SB-4/GW-4: Located east of the southern-most Quonset hut (the Transversal International building). A former 20,000-gallon UST that reportedly contained diesel was removed from this area in 1988 and a fuel pipeline that transported fuel between the UST and the dock also is located in this area. Only TPH for DRO will be collected from the soil and VOC and SVOC will be collected from the groundwater at this location to determine if the UST had released petroleum.
- SB-5/GW-5: Located near the dock east of the Marine Finance office trailer. A fuel pipeline transferred petroleum from the USTs near the office trailer area to the dock area to fuel river vessels and likely was also used to transfer fuel from river tankers to the site USTs. Additionally, this location is downgradient of the former scrap metal storage area. Historic contents that may have been released from past storage are unknown but may have included POL, solvents, paints/antifoulant biocide paints for marine vessel maintenance, and PCB from transformer storage associated with the scrap metal storage. Therefore, TPH for DRO, VOC, SVOC, TBT, and metals will be tested in the soil. TPH for DRO, VOC, SVOC, and metals will be tested in the groundwater.
- GW-6: Located south of the Transversal International Corporation Trailer and away from the shore line enough to prevent obstruction from riprap and influence from the river. This area is downgradient of the Quonset huts and other potential contamination sources, including a former scrap metal and material storage area. Metals are the primary contaminants of interest in this area, but POL and solvents may also be present. Therefore, VOC, SVOC, and metals will be tested in the groundwater.
- GW-7: Located approximately half way between the St. Johns Bridge and the Hendren Tow Boat Dock and away from the shore line enough to prevent obstruction from riprap and influence from the river. As with GW-6, this area is downgradient of potential contamination sources and is located at a potential material storage area. Therefore, VOC, SVOC, and metals will be tested in the groundwater.

5.2.2 Exploration Depths

Groundwater is expected to be encountered at approximately 25 feet bgs. All exploratory probes will be advanced 5 feet below first anticipated groundwater to a maximum of 30 feet bgs, or refusal. The sample interval with the highest likelihood of contamination as discussed in Section 6.1.1 will be selected for analysis.

Groundwater samples will be collected from near the top of the aquifer upon completion of the soil sampling if groundwater is encountered before termination of the soil boring at 30 feet bgs.

5.3 SURFACE SOIL SAMPLING

Surface soil samples will be collected from 11 locations across the site where current or past operations are suspected to have released or be releasing hazardous substances to the environment. Figure 5-1 illustrates the approximate locations of the surface soil sample

locations (SS-1 through SS-11). As indicated above, actual locations will be determined in the field based on: (1) approximate locations represented on Figure 5-1 using available landmarks; (2) best professional judgment to select a sample location that will best represent potential contamination in the area; and (3) site-specific conditions. In area of obvious surface soil contamination, samples will either be collected immediately adjacent to the contaminated area or six inched below the stained soil. Final sample locations will be measured from two permanent landmarks and documented in the field logbook and on the sample collection form.

Eight of the surface soil locations will be grab samples and the other three will be composite samples. Sampling procedures are presented in Section 6.1.1. Composite samples will be used as discussed below in areas where general material storage was documented but precise locations can not be determined or where contamination is suspected from potential operations.

The rationale for each sample location is described below:

- SS-1: Located south of the St. Johns Bridge in an active drum storage area near the location of SB-1. Additionally, the northern end of the former warehouse was present in this area and the foundation was later used to store unknown materials. Current contents of the drums and historic contents that may have been released from past storage are unknown but may have included POL, solvents, and paints/antifoulant biocide paints for marine vessel maintenance, and PCB from transformer storage associated with the scrap metal storage. Therefore, a grab-type sample within the drum storage area will be collected for analysis of TPH for DRO, VOC, SVOC, TBT, metals, and PCB.
- SS-2: Located south of the St. Johns Bridge further south of SS-1 in another drum storage area. Additionally, the southern end of the former warehouse was present in this area and the foundation was later used to store unknown materials. Current contents of the drums and historic contents that may have been released from past storage are unknown but may have included POL, solvents, and paints/antifoulant biocide paint for marine vessel maintenance, and PCB from transformer storage associated with the scrap metal storage. Therefore, a grab-type sample within the drum storage area will be collected for analysis of TPH for DRO, VOC, SVOC, TBT, metals, and PCB.
- SS-3: Located east of the Marine Finance office trailer south of the dock in an area where an oil stain was noted during the site visit and where scrap metal was historically stored. The source of the oil stain is unknown, but could be POL or PCB. A grab sample will be collected from the oil stained area for analysis of TPH for DRO, SVOC, and PCB. A composite sample from four locations spaced on an approximate 20-foot grid will be collected from the area of the oil stain and surrounding area of historic metal storage for analysis of metals.
- SS-4: Located west of the dock in the area where scrap metal was historically stored. The source and types of scrap metals stored, such as PCB containing transformers, are unknown. Therefore, a composite sample from four locations spaced on an approximate 20-foot grid will be collected from the area for TPH for DRO, metal and PCB analysis.
- SS-5: Located east of the Transversal International building (southern-most Quonset hut)
 adjacent to the bay door. Poor housekeeping, miscellaneous debris, and staining were noted
 during the site visit. Additionally, waste material and past releases from the Quonset hut

may have been discharged (e.g. swept out the door or discarded), but materials used and stored in the building are unknown. Therefore, a grab-type sample will be collected for analysis of TPH for DRO, SVOC, and metals.

- SS-6: Located on the east side of Blackcat Studios and the N.W. One Design. Soil staining and drums were noted during the site visit. A composite sample comprising two locations near the bay doors will be collected for analysis of TPH for DRO, SVOC, metals, and PCB. However, the VOC sample will be collected from a single location based on best professional judgment to minimize loss of volatile organics while homogenizing the composite sample.
- SS-7: Located in the northern portion of the site near an area where carboy containers were discarded. The content of the carboys is unknown and historic contents that may have been released are unknown, so a grab-type sample will be collected for analysis of TPH for DRO, VOC, SVOC, TBT, and metals.
- SS-8: Located outside of the perimeter fence along the access road in the southern portion
 of the site where ODOT has material stored. The site has been noted as an unauthorized
 dumping area (PBSE 1993) and public access is not restricted in this area. A grab-type
 sample will be collected for analysis of TPH for DRO, VOC, SVOC, PCB, and metals will
 be tested.
- SS-9: Located in the general area of the Mark Even Construction dock. A discretionary
 riverbank sample will be collected to help determine additional contaminated areas based
 on field observations considering potential stormwater runoff. Analysis will include VOC,
 SVOC, TBT, and metals based on best professional judgment.
- SS-10: The location of this sample will be between the Transversal International Corporation trailer and the pier which lies to the south, adjacent to the river. A discretionary riverbank sample will be collected to help determine additional contaminated areas based on field observations considering potential stormwater runoff. Analysis will include SVOC and metals based on best professional judgment.
- SS-11: Located south of the St. Johns Bridge adjacent to the Willamette River. A
 discretionary riverbank sample will be collected to help determine additional contaminated
 areas based on field observations considering potential stormwater runoff. Analysis will
 include SVOC and metals based on best professional judgment.

5.4 SURFACE WATER AND SEDIMENT SAMPLING

Sediment samples will be collected from five locations in the Willamette River adjacent to the shoreline along the length of the Marine Finance site, which includes an upstream sample location (SD-6) serving as a background sample, and another sediment sample will be collected from the seep area in the northern portion of the site. A surface water sample will also be collected from the seep before the sediment sample is collected. The other surface water sample will be collected from the drainage pipe in the northern portion of the site.

Sediment samples will be collected from the 0-30 cm depth in the biologically active zone at all locations and additionally in the 30 cm to 90 cm interval at each Willamette River location. The sediment sample locations are depicted on Figure 5-1. No outfalls from the site discharge

directly to the Willamette River, but potential site contamination could be transported to the sediments by overland surface water flow during storm events or from operations along the shoreline. Additionally, potential site contamination could be transported to the Willamette River through the seep and/or the drainage pipe. The sample locations in the Willamette River are based on runoff from areas of the site where past operations may have caused releases of hazardous substances as discussed in Section 3.0. Actual sample locations will be determined in the field based on: (1) approximate locations represented on Figure 5-1 using available landmarks; (2) best professional judgment to select a sample location that will best represent potential contamination in the area; and (3) offsetting required if the sampling platform (boat) cannot reach the location.

Except for SD-5, all sediment sampling points in the Willamette River are located approximately 50 feet from the shoreline because it is assumed that suspended solids carried in stormwater runoff from the site would fall from suspension and be deposited as sediment at an average distance of 50 feet. The sediment samples (SD-4 and SD-5) near the Hendren Tow Boat operations will be located immediately downstream of the operations for assessment of potential releases from these operations. Also, it is assumed that no significant dredging of the channel would occur within 50 feet of the shoreline, so little disturbance of the sediment or re-depositing of other sediment should result. The sediment sample from the seep will be collected within the seep pool itself.

Sediment samples will be tested for TPH for DRO, TPH for hydrocarbon identification (HCID), SVOC, TBT, and metals. PCB will also be tested at most locations. Sediment samples from the Willamette River will also include TOC, total solids and grain size, and water content. Surface water samples will be tested for VOC, SVOC, and metals. Concentrations will be compared with baseline values in the Portland Harbor Sediment Management Plan. The rationale for each location is described below:

- SD-1/SW-1: Located in the seep pool in the northern portion of the site northwest of Mark Even Construction. Both a surface water and a sediment sample will be collected from the seep to determine if potential contaminants from the upgradient areas are being transported to the seep and potentially to the Willamette River. As indicated in Section 3.0, general disposal, including carboys, was noted in the upgradient areas, but the contents and potential historic releases in the area are unknown. Potential contaminants are POL, solvents from painting operations, paints and antifoulant biocide paints, herbicides, PCB, and metals from drums and scrap metal storage. TPH for DRO, TPH for hydrocarbon identification (HCID), SVOC, TBT, PCB, metals, TOC, total solids, grain size, and water content will be tested in the sediment. The surface water sample will be analyzed for VOC, SVOC, and metals.
- SD-2: Located northwest and downstream of the Mark Even Construction dock (north dock) in an area where runoff from the site would accumulate. As indicated in Section 3.0, previous operations and the current Mark Even Construction operation potentially uses latex and oil-based paints, stains, antifoulant biocide paints, paint thinner, and related materials.

Historic use of the north dock is unknown and therefore the potential historic releases are also unknown. Further, general disposal, including carboys, was noted in the upgradient areas, but the contents and potential historic releases in the area are unknown. Potential contaminants are POL, solvents from painting operations, paints and antifoulant biocide paints, PCB, and metals from drums and scrap metal storage. This location will be used to determine if contaminants have been transported from the site, and specifically operations at the north dock, have contaminated the sediments in the Willamette River. TPH for DRO, TPH (HCID), SVOC, TBT, metals, TOC, total solids, grain size, and water content will be tested.

- Historic operations at the middle dock are unknown, but the upgradient area was used for scrap metal storage and an abandoned fuel line terminated adjacent to the dock. Therefore, it is inferred from the abandoned fuel line, adjacent scrap metal storage, and the central location of the dock on the Marine Finance site that the dock was previously used at a minimum for transfer of scrap metal to and from water vessels; the dock was also likely used to supply fuel from river tankers to the three USTs onsite and/or supply fuel to boats. It is also possible that other materials potentially associated with the site, such as transformers (PCB), solvents, and paints, may have been transferred to and from the site on this dock. Therefore, this location will be used to determine if POL, antifoulant biocide paints, PCB, or metals carried from the site, and specifically operations occurring at the middle dock, have contaminated the sediments in the Willamette River. TPH for DRO, TPH (HCID), SVOC, TBT, metals, PCB, TOC, total solids, grain size, and water content will be performed on the sediment.
- SD-4: Located north and downstream of the Hendren Tow Boat operations. As indicated in Section 3.0, the Hendren Tow Boat operations use POL, solvents, and likely incidental paint and associated products. Historic use of the dock is uncertain. Upgradient land use currently includes drum storage. The former warehouse was located upgradient and its foundation was later used to store materials. This location will therefore be used to determine if POL, antifoulant biocide paint, PCB, or metals carried from the site, and specifically operations occurring at the middle dock, have contaminated the sediments in the Willamette River. TPH for DRO, TPH (HCID), SVOC, TBT, PCB, metals, TOC, total solids, grain size, and water content will be tested.
- SD-5: Located north of, in the center of, and downstream of the Hendren Tow Boat operations. As with SD-4, this location will therefore be used to determine if POL, antifoulant biocide paint, herbicides, PCB, or metals carried from the site, and specifically operations occurring at the middle dock, have contaminated the sediments in the Willamette River. TPH for DRO, TPH (HCID), SVOC, TBT, PCB, metals, TOC, total solids, grain size, and water content will be performed on the sediment.
- SD-6: Located approximately 100 feet upstream of the Hendren Tow Boat operations as a
 baseline sample for the Marine Finance site. TPH for DRO, TPH (HCID), SVOC, TBT,
 PCB, metals, TOC, total solids, grain size, and water content will be tested.

Limited surface water is available on the site, notwithstanding the Willamette River. A seep is located near the north corner of the property adjacent to the shoreline, so a surface water sample will be collected to determine if the water discharging and migrating to the river shows any indicates of contamination from the site (see above for co-located sediment location SD-1). A

drainage pipe is also located on the north side of the site that apparently de-waters a low-lying saturated area to the north of the site (i.e. on the adjacent property to the north). The water from this drainage pipe discharges and migrates across the site near the seep. Therefore, a surface water sample, location SW-2, will be collected if the drainage pipe is flowing to determine whether any indications of contamination are present and leaving the site. As indicated in Section 3.0, general disposal, including carboys, was noted in the upgradient areas, but the contents and potential historic releases in the area are unknown. Potential contaminants are POL, solvents from painting operations, paints and antifoulant biocide paints, PCB, and metals from drums and scrap metal storage. Both surface water samples will be sampled for VOC, SVOC, and metals.

Finally, a surface water sample of opportunity will be collected and analyzed for VOC, SVOC, and metals if runoff is discovered or encountered during any storm event. Best professional judgment will be used to select a sample location that will best represent potential contamination in the area.

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6.0 SAMPLING AND ANALYSIS PROGRAM

This section includes the field sampling plan, which describes the sampling procedures and analytical methods to be used for the samples collected from locations indicated in Section 5.0. Decontamination procedures and handling of IDW are also included.

6.1 FIELD AND SAMPLING PROCEDURES

The following describes collection procedures for soil, groundwater, surface water, and sediment samples.

6.1.1 Collection of Soil Samples

Both surface and subsurface soil samples will be collected at the site from the locations described in Section 5.0 and as depicted on Figure 5-1. Analyses required at each location are discussed in Section 6.4 and defined in Table 6-1.

Subsurface Soil Sampling Procedure

The subsurface soil sampling procedure involves driving a 1-inch (large bore) or 2-inch diameter (macro core), 2-foot or 4-foot-long, push probe sampler equipped with a polyvinyl chloride (PVC) or acetate liner or equivalent to the desired depth using a combination of hydraulic pressure and mechanical hammer blows. The specific type of sampler will be selected based on site conditions. A concrete coring machine may be required to remove concrete from some sample locations to allow drilling such as near the former warehouse. The DPT rig will be operated by an Oregon licensed driller. When the sampling depth is reached, the pin attaching the sampler's tip is released which allows the tip to slide up inside the sampler. The sampler is then driven another 2 or 4 feet (the length of the sampler) to collect a soil core and is withdrawn from the exploration.

All subsurface soil sample probes will be advanced 5 feet below groundwater to a maximum depth of 30 feet bgs. If refusal is met above a depth of 15 feet bgs, the borehole will be offset and sample aliquots collected starting at the depth of the refusal. Offsetting and additional borehole advancement will not be required if refusal is met after groundwater is intercepted.

The sampler is opened upon retrieval from the borehole and the liner with the soil core is removed. The sample interval will be labeled on the liner and an aliquot placed in a resealable plastic bag also labeled with the sample interval. Vapor measurements will be made on the soil using a photoionization detector (PID) equipped with a 10.6 electron-volt (eV) probe to screen for VOCs. Approximately 100 grams of soil will be placed in a re-sealable plastic bag labeled with the soil core interval and inverted several times then placed out of direct sunlight to reach

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equilibrium. After at least 5 minutes, the headspace in the bag will be monitored with the PID. This examination will be conducted on each soil core interval. Sample cores will be collected continuously for lithologic logging purposes using the Unified Soil Classification System (USCS), and for screening of the entire bore for evidence of contamination (i.e. PID screening and observation of olfactory and visual indications). The soil core interval with the highest PID reading or the most contaminated interval based on visual, olfactory, and/or best professional judgment will be collected in appropriate sample containers for submission for analytical testing.

Surface Soil Sampling Procedures

Surface coverings, such as vegetation, debris, rocks, and obvious contamination (e.g. stained soil) will be removed using a decontaminated stainless steel trowel or spoon to expose the underlying soil. Any VOC sample will be collected immediately to minimize the loss of volatiles in compliance with extraction method SW5035. The surface soil interval, which is from the ground surface to approximately 6-inches bgs, will be selected based on the area closest to the surface in which a sample can be collected without significant interference from vegetation, debris, rocks, and obvious contamination. Vegetation, debris, and rocks will be removed from the sample aliquot to the extent practicable.

Composite samples will be collected from locations SS-3, SS-4, and SS-6. Locations SS-3 and SS-4 are located in the former scrap metal storage area, but the precise location of metal storage is uncertain. Therefore, composite samples will be collected from 4 points spaced approximately 25 feet apart at each location to improve the likelihood of capturing a point where scrap metal had previously been stored. It is assumed that an access aisle for scrap metal moving equipment would be approximately 25 feet wide. Therefore, a grid with 25-foot spacing will be established around the sample location. A sample aliquot measuring approximately one-half of the total volume required will be collected from each of the four corners of the grid after surface coverings, such as vegetation, debris, and rocks, are removed to expose the underlying soil. The sample will be homogenized in a stainless steel mixing bowl and then transferred to the sample containers. The sample for VOC analysis, however, will be collected as a grab sample from a single point at SS-3 and SS-4 which will be selected based on best professional judgment.

Location SS-6 comprises a total of 2 points to the east of the north Quonset hut near areas of soil staining. A sample aliquot measuring approximately one-half of the total volume required will be collected from each of the locations after surface coverings, such as vegetation, debris, rocks, and visible staining are removed to expose the underlying soil. Selection of the locations will be based on best professional judgment using indication such as soil staining, stressed vegetation, and other indications of likely discharges. The sample will be homogenized in a stainless steel mixing bowl and then transferred to the sample containers. The sample for VOC analysis, however, will be collected as a grab sample from a single point at SS-6 which will be selected based on best professional judgment.

QA/QC Soil Samples

For QA/QC purposes, duplicate samples will be collected at a rate of 5 percent, or one in every 20 samples. Therefore, one duplicate soil sample will be collected. Subsurface soil duplicates will be collected by splitting a subsurface soil core in half longitudinally at a sampling interval to create two samples collected from the same depth. Surface soil duplicates will be collected by alternating collection of surface soil between the containers for the environmental and duplicate samples. Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a rate of 5 percent, or one in every 20 samples. Therefore, one MS and one MSD soil sample will be collected for selected analyses. No equipment rinsates will be collected.

6.1.2 Collection of Groundwater Grab Samples

Groundwater grab samples will be collected from the borehole locations (Figure 5-1) and analyzed as discussed in Section 6.4 and defined in Table 6-1. Upon completion of the probe to approximately 3 feet below the water surface, the drill string will be removed and re-fitted with a temporary well point. Polyethylene tubing will be attached to the well point and threaded through the drill string during advancement. After reaching the total depth, the well point will be driven an additional 2 feet into native soil.

DPT probes will be advanced until groundwater is reached. Discretion and the judgment of the DPT driller will be used to determine if a groundwater sample is not able to be collected due to repeated refusal.

Each temporary well point will be purged of three hole volumes using a hand operated inertia pump prior to sampling if possible. The depth of the boring, the approximate depth to water, the calculated casing volume, and the actual volume of water purged will be documented in the field logbook and on the sample collection form. If the well purges dry, the purging will be considered complete. If the well is purged dry, it will be allowed to recover to at least 50% of its original volume before sampling is performed. The wells will be purged using a hand operated inertia pump.

After purging, groundwater samples will be collected using the same methodology used for purging. The pumping rate will be slowed to avoid agitation of the water and off gassing of VOCs. VOC samples will be collected first and then SVOCs and remaining analyses.

QA/QC Groundwater Samples

For QA/QC purposes, duplicate samples will be collected at a rate of 5 percent, or one in every 20 samples sample for chemical analysis. Therefore, one duplicate groundwater sample will be collected. Duplicate samples will be collected by alternating the filling of environmental and

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duplicate sample containers. MS/MSD and equipment rinsate samples will not be collected for analysis because these groundwater data are considered screening level data.

6.1.3 Sediment Sampling

Shallow sediment samples from the biologically active zone less than 30 cm below the sediment and water interface will be collected using an Ekman DredgeTM, gravity coring, or equivalent bottom dredge sampling method from a boat to retrieve sediment from the Willamette River. The 30 cm to 90 cm interval below the sediment and water interface from the Willamette River sediments will be collected using a gravity corer.

With the exception of SD-5, all sediment samples from the Willamette River will be collected from approximately 25 feet from shore as indicated in Section 5.4. SD-5 will be collected between SD-4 and the shore immediately downstream of the Hendren Tow Boat operations. A subcontractor which operates a licensed and insured boat compliant with all U.S. Coast Guard (USCG) requirements will perform the sediment sampling, but Jacobs will collect, control, and document all samples.

A differential global positioning monitoring system will be used to determine the sample collection location to a horizontal accuracy of within 3 meters. Each sampling location will be tied to the North American Vertical Datum NAVD to allow conversion to latitudes and longitudes. The boat captain will maintain the boat in the appropriate position or will use a 3-point anchor system to maintain the sample collection location within 3 meters. The sediment sampler will then be lowered from the side of the boat to the bottom of the river for collection of a sediment aliquot. The aliquot will be retrieved and immediately transferred to the appropriate sample containers. All reasonable efforts will be made to minimize aeration or rinsing of the sample during retrieval.

The sediment sample from the seep (SD-1) will be collected using a stainless steel trowel or spoon from the seep pool. The sediment samples will be placed into glass sample jars for shipment to the analytical laboratory.

QA/QC Sediment Samples

For QA/QC purposes, duplicate samples will be collected at a rate of 5 percent, or one in every 20 samples sample for chemical analysis. Therefore, one duplicate sediment sample will be collected. Duplicate samples will be collected by splitting the sediment sample aliquot between environmental and duplicate sample containers. MS/MSD samples will be collected at a rate of 5 percent, or one in every 20 samples sample for chemical analysis. Therefore, one MS and one MSD sediment sample will be collected. Equipment rinsate samples will be collected once per day to evaluate adequacy of decontamination of sample collection equipment.

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6.1.4 Surface Water Sampling

Surface water samples will be collected from the two locations depicted on Figure 5-1. Analyses required at each location are discussed in Section 6.4 and defined in Table 6-1. The surface water sampling procedure involves collecting an aliquot of surface water discharge from the water body or flow in a Teflon beaker. The aliquot will be collected in a reasonable manner that reduces aeration of the water to minimize offgassing of volatile organics. The aliquot will immediately be transferred directly to the VOC sample containers and then to containers for the SVOCs and remaining analyses.

OA/OC Surface Water Samples

For QA/QC purposes, duplicate samples will be collected at a rate of 5 percent, or one in every 20 samples. Therefore, 1 duplicate sample will be collected from the 2 locations. Duplicates will be collected by alternating the filling of the environmental and duplicate sample containers. MS/MSD samples and equipment rinsates will not be collected.

6.2 ANALYSES FOR CHEMICALS OF CONCERN

A commercial analytical laboratory will be procured for performing the required chemical analyses on the surface and subsurface soil, sediment, surface water and groundwater samples. Samples will be analyzed on a standard turnaround time (30 calendar days). The chemicals-of-concern at this site, as discussed in Section 3.0, are petroleum-based products used as fuel and for lubrication, including diesel, gasoline, oils, and lubricants; paints, stains, and antifoulant biocide paint; solvents; PCB; as well as metals stored or processed at the site as part of scrap metal operations. Therefore, the analytical program will focus on analysis for TPH, VOCs, SVOCs, PCB, and metals. TBT in the sediment and selected soil locations will be analyzed.

The purpose of this investigation is to determine whether hazardous substances have been released or are threaten to be released at the Marine Finance facility and have been transported to Willamette River sediments. The above analyses will identify the most likely contaminants from current operations and persisting from historic operations and includes identification of tentatively identified compounds because of the uncertainty of previous site operations and storage. However, it is not a comprehensive list of potential contaminants of concern. Therefore, future investigations may be required to fill data gaps pending data from this preliminary investigation.

Soil and Sediment Samples

Table 6-1 indicates the sample analysis required for the 5 subsurface soil, 11 surface soil, and the 11 sediment samples. Most soil and sediment samples will be analyzed for diesel range organics by NWTPH-Dx, SVOC by SW8270C, PCB by SW8082, and metals by SW6010B. Because the

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type of scrap metal stored onsite is unknown, priority pollutant metals under SW6010B will be analyzed, including antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc. Most soil samples will be analyzed for VOC by SW5035/8260B, however, sediment samples will not include VOC analysis. All sediment samples and select soil samples will also be tested for TBT by the Krone method (Krone et al 1989). However, chemical analyses required are based on the known and/or suspected historical activities at specific locations, so the complete list of soil and sediment samples and associated analytical requirements is included in Table 6-1. Table 6-2 summarizes the number of environmental and quality control samples required.

The sediment samples will also include TPH (HCID) by NWTPH-HCID, TOC by SW9060, total solids and grain size by the American Society for Testing and Materials (ASTM) D422, and water content by ASTM D2216 (ASTM 1998a and 1998b).

One soil sample will be a duplicate sample and one sample will be a double volume for matrix spike/matrix spike duplicate (MS/MSD) QA/QC. A trip blank will be submitted to the laboratory for QA/QC purposes with each sample cooler containing samples for VOC analysis.

Groundwater Samples

Groundwater samples from 7 locations indicated in Table 6-1 and depicted on Figure 5-1 will be analyzed for VOCs (SW8260B) and SVOCs (SW8270C). Three locations will also include TPH analysis (NWTHP-Dx) and five locations will include metals (SW6010B). Because the type of scrap metal stored onsite is unknown, priority pollutant metals under SW6010B will be analyzed.

One groundwater sample will be a duplicate sample. A trip blank will be submitted to the laboratory for QA/QC purposes with each sample cooler containing samples for VOC analysis. An equipment blank will not be collected.

6.3 SAMPLE ANALYSIS REQUIREMENTS

Table 6-2 summarizes the number of environmental (investigation) samples and field quality control samples, including duplicates, trip blanks, and MS/MSDs, required for each analysis in the soil, sediment, and groundwater. Table 6-1 indicates the specific sample analyses required at each location for the media sampled. Table 6-3 indicates the requirements for sample container specifications, number of sample containers, holding times, preservatives for each analysis.

6.4 DECONTAMINATION

To prevent cross contamination between sampling events, clean unused or dedicated sampling equipment (e.g., groundwater sampling tubing, and containers) will be used when possible for

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each sampling event and discarded after use. Non-disposable items will be cleaned by washing with detergent (Alconox) solution, rinsing with tap water, followed by a de-ionized water rinse.

6.5 INVESTIGATION DERIVED WASTE

IDW will consist of soil left over from sampling, decontamination water, purge water, and PPE. PPE will be disposed of as solid waste.

IDW from the boreholes will be minimized because DPT will be used, but the soil cores not selected for laboratory analysis will require disposal. IDW will be placed in a properly labeled drum and stored on the site until the analytical results from the soil samples are available. The drum storage location will be coordinated with Marine Finance representatives. It is anticipated that the analytical data from the samples collected during the investigation will be sufficient to classify the IDW for proper disposal. The drum will be left onsite for later disposal at an unspecified time.

Decontamination and purge water will be placed in a properly labeled drum and stored on the site. This drum will be stored adjacent to the soil drum in a location agreed to by Marine Finance representatives. A wastewater sample will be collected from the drum for waste characterization analysis. The drum will be left onsite for later disposal at an unspecified time.

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7.0 QUALITY ASSURANCE PLAN

The following sections describe the testing and analytical procedures for the investigation activities to be performed for the Marine Finance XPA including data quality objectives, sample collection and quality control procedures, analytical quality control procedures, data quality management, and quality assurance oversight.

7.1 DATA QUALITY OBJECTIVES

The quality assurance objectives of this project are to develop and implement procedures to provide data of known and appropriate quality. Data quality is assessed by accuracy, precision, representativeness, completeness, and comparability.

The purpose of the Marine Finance XPA is to determine whether hazardous substances have been released or threaten to be released at the Marine Finance facility from current or historic operations and have been transported to Willamette River sediments. Sampling results will be used to assess the contaminant migration pathways and exposure pathways, which were discussed in Section 4.0, including the groundwater pathway of exposure, the air pathway of exposure, the direct contact pathway of exposure, and the surface water and sediment pathways of exposure.

Limited previous environmental investigations have been conducted, so this XPA will provide the foundation for any future investigations deemed necessary. If contamination is identified, the soil, sediment, and surface water data collected will be of sufficient quality to:

- Assess the nature and extent of contamination at the site;
- Assess risk to human health and the environment;
- Assess potential injuries to natural resources, impairment of beneficial uses, and impacts to threatened and endangered species;
- Assess potential contribution to contamination in the Portland Harbor.

While the data quality may be of sufficient quality to meet these objectives, the XPA is not meant to complete assessment of these potential later objectives. Therefore, the subcontracted laboratory will compile and report the analytical results to Jacobs in format allowing determination of data quality relative to USEPA Level III criteria. Groundwater data will only be of screening quality due to the sample collection method and will therefore not achieve USEPA Level III criteria. Data validation is discussed in Section 7.5.

Groundwater data, however, will only be screening level type data and therefore USEPA Level I criteria will be sufficient. These data will not be of sufficient quality to provide the same information as the soils, sediment, and surface water. Groundwater monitoring wells may need

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to be installed in the future depending on the screening level results obtained from this study for collection of groundwater samples to obtain data sufficient to characterize the site.

Table 7-1 presents a summary of the analytical parameters to be investigated and the required quantitation limits and quantitative data quality objectives (DQOs).

7.1.1 Accuracy

Accuracy is the measure of the degree of agreement between an analytically determined value and the true accepted value. Accuracy of the analytical procedure is measured by spiking a blank sample with known analytes and surrogates at known concentrations and carrying the spiked blanks through the analyses. The blank matrix for water is laboratory-pure water; the blank matrix for soils or sediments for organic analyses is Ottawa sand or other soil or sand that is well characterized.

7.1.2 Precision

Precision of the data is a measure of the variability when repetitive measurements are taken on the same sample. For duplicate measurements, precision can be expressed as the relative percent difference (RPD). The field duplicate will be carried through the entire analytical procedure. For organic analyses, precision is measured through the preparation and analysis of a matrix spike. The level of effort for precision measurements will be a minimum of one sample in 20 samples or one per batch.

7.1.3 Representativeness

Representativeness is an unquantified QC criterion. It is a qualitative measure of the similarity of results for different samples so that confidence may be established that the data set truly represents the site. Representativeness is reflected through the degree of agreement among field duplicate samples, the formation of patterns of concentrations spatially, and the consistency of seeing specific analytes.

7.1.4 Completeness

Completeness from the analytical perspective is the ratio of the valid results obtained to the total number of results expected. For multi-analyte methods, a completeness factor may be applied to each sample. The completeness factor is a measure of the fraction of valid results for a single sample.

7.1.5 Comparability

Comparability is another unquantified QC criterion. Qualitatively, comparability is a measure of the uniformity and consistency of applying sampling and analytical methods so that the data sets may be compared from one site to another, one period to another, or among different operators. To achieve comparability, strict and well-defined protocols, such as standard operating procedures (SOPs) and USEPA analytical methods, will be used for both sampling and analysis. Data will be reported in consistent units as specified in the analytical methods or SOPs.

7.2 FIELD QUALITY ASSURANCE/QUALITY CONTROL

A QA/QC program will be implemented to ensure that the data collected are of acceptable and documented quality. Field QC samples will be submitted to ensure that the sampling procedures and the laboratory's measurement system are operating properly. This will be accomplished by the analysis of trip blanks and matrix spike samples. The concentration of the matrix spike sample is known to the analyst in the laboratory. Laboratory QC samples exceeding control limits require that corrective action be applied until the obtained results are within program acceptance limits. The use of control charts and quality control limits maintain sample quality; QC samples control data quality.

Field QC samples will be submitted to the laboratory in such a way that the analysts can not bias the results. Such samples will be submitted to the laboratory "blind" in the form of field duplicates. Results from QC sample analyses will be evaluated independently to ensure the integrity of the sample data with respect to DQOs.

7.2.1 Trip Blanks

Trip blanks (or transport blanks) will be analyzed to determine if volatile contamination is occurring during the storage of empty sample containers and transport of the samples on and from the site. Trip blanks will be prepared by the analytical laboratory [40-milliliter (ml) volatile organic analysis (VOA) vials containing laboratory-grade reagent water per trip blank] and sent with the coolers to the site. The sampling team will carry them into the field as samples are being collected. One trip blank will be included in each cooler.

7.2.2 Field Duplicate Samples

Collection and analysis of field duplicate samples provide an overall estimate of variability (precision) associated with sample collection and analysis. Field duplicates will be submitted at a frequency of one for every 20 field samples collected (5 percent). Field duplicates, collected as either co-located samples or split samples, will be collected in as identical a manner as possible to minimize sampling variability.

7.2.3 Matrix Spike Samples

Matrix spike samples are duplicate field samples prepared and analyzed by the laboratory to measure precision and assess matrix effects. The sample is split into three aliquots and known concentrations of analytes are added (spiked) to each of the aliquots before sample preparation. All three aliquots are then analyzed. The recovered spiked analytes are then calculated and compared to each other. Additionally, matrix effects inherent in the specific sample will be evaluated by comparing the results to the spiked blank. Matrix spike samples are submitted at a frequency of one for every 20 field samples collected (5 percent). Therefore, one sample will be analyzed a total of three times: once for the normal sample, once for the matrix spike, and once for the matrix spike duplicate. MS/MSD samples will only be run for selected analyses.

7.3 FIELD EQUIPMENT

During site sampling activities, and to meet the requirements of the HSP, ambient air quality will be monitored for organic vapors. A PID will be used for this purpose. Groundwater sampling operations will require measurement of water quality parameters, including specific conductance, pH, temperature, and dissolved oxygen. Instruments that will be used to measure these parameters will be calibrated, maintained, and decontaminated according to manufacturers' recommendations.

7.4 SAMPLE CUSTODY

Proper sample custody procedures are essential to provide legally defensible results for possible use in a court of law. Implementation of proper chain-of-custody procedures will ensure that custody is documented for every step in the handling of the sample. A sample is considered "in custody" if:

- It is in your possession;
- It is in your view, after being in your possession;
- It was in your possession and you placed it in a secured area; or
- It is in the designated secure area.

7.4.1 Field Documents

Bound and controlled field notebooks will be used to document sampling activities. Entries into the field logbook and field data forms will be made legibly and completely. Each entry will include the sample location, station number, and sample identification number. Field observations will be recorded with pertinent information necessary to explain and reconstruct field activities.

Field data forms will be submitted to, and reviewed by, the assigned field team leader. Data will be checked for completeness, accuracy, and adherence to sampling protocols. Inconsistencies or deviations from planned sampling will be identified promptly and dealt with immediately.

The laboratory receiving the samples to be analyzed will provide the final sign-off on the chain-of-custody record. The receiving agent for the laboratory is responsible for inspecting all coolers, verifying the integrity of the custody seals and contents, and confirming that each sample received is as denoted on the attached chain-of-custody record. Any problems in the transportation or condition of samples will be brought to the attention of the Project Manager as soon as possible before the initiation of any analyses. Samples will be logged in serially numbered standard laboratory tracking report sheets and secured in controlled refrigerated sample storage areas, as necessary, before analysis.

7.4.2 Sample Labels

The sample label will be used to identify each individual sample. The label will correspond to information contained in the chain-of-custody form. The sample label will contain the following:

- Project Name
- Project Number
- Sample Number
- Date of Sample Collection
- Time of Sample Collection
- Sampler's Initials
- Preservatives Used
- Analyses Requested

Each sample container will have a label. The label will be attached to the exterior of the container and covered with transparent tape. To prevent the label from getting wet, each sample container will be placed in a plastic Ziplock® or equivalent bag.

7.4.3 Custody Seals

Custody seals are tapes that are attached across the opening of the cooler after packing of the cooler is complete. Because these seals are exposed, it is possible that a seal will be broken accidentally during shipping. Therefore, more than one seal will be placed on each cooler. The custody seal will be signed and dated by the individual relinquishing the custody of samples.

7.4.4 Chain-of-Custody Procedures

Chain-of-custody records will be generated for each sample collected. Each chain-of custody will contain detailed sampling information enabling the sampler to collect and ship the samples to the contract laboratory. The chain-of-custody record will be initiated by the sampler who collects the field sample. Whenever a sample is transferred to another responsible party, the chain-of-custody record will be signed by the person relinquishing the samples and the receiving agent. The original chain-of-custody record will accompany samples in each cooler shipped and a copy of the chain-of-custody retained in the project file.

7.4.5 Corrections to Field Documentation

Original data recorded in field logbooks, calculation briefs, field data forms, custody records, and other data sheet entries will be written with waterproof ink. Corrections will be made by marking through the incorrect entry with a line and initialing and dating the marked correction. All unused or replaced sample labels and chain-of-custody forms will be marked "void," signed and dated by the field team leader, and retained in project files.

7.5 DATA REDUCTION, VALIDATION, AND REPORTING

Initial data reduction and validation at the laboratory will be carried out as specified by the respective analytical methods. All samples shipped to the laboratory will be grouped into a sample delivery group (SDG). For each SDG, the complete results package will be due within 30 days from receipt of the samples. The laboratory will be responsible for reviewing all the data and assuring that the package submitted is correct based on the raw data.

Data validation will consist of reviewing the laboratory data against the analytical methods and protocols established for this investigation according to the professional judgment of the Jacobs Project Chemist. The evaluation of the utility of the data will be based on the results of the QC samples, the level of contamination of samples indicated by blank analysis, and the overall indications of interferences due to contamination.

7.5.1 Data Assessment Procedures

Data assessment will follow the data review and validation procedures described above. An assessment report will summarize the findings of the data review/validation as relevant to project usage. Data accuracy, precision, and completeness values will be summarized in the assessment report.

7.5.2 Quality Assurance Reports

A quality assurance report, or data validation report, will be prepared by the Project Chemist or Field Team Leader concerning the performance of sample collection and data quality. The quality assurance report will include the following:

- Assessment of accuracy, precision, representativeness, completeness, and comparability;
- Evaluation of holding time compliance for extraction and analysis;
- · Evaluation of reporting limits;
- Significant QA problems and recommended solutions.

In addition, sampling and data quality information will be summarized and included in the report of the investigation. The data validation reports will be included as an appendix to the XPA summary report Section 9.0.

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8.0 HEALTH AND SAFETY PLAN

The Jacobs site-specific HSP and safe plan of action (SPA) is included as Appendix D.

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9.0 REPORTING

After the field activities are completed and the analytical results are available, an XPA Summary Report documenting the field activities, analytical results, and conclusions will be prepared. The objective of the XPA Summary Report is to document the data supporting a conclusion whether a site is releasing, has released, or could release hazardous substances to the environment. Sample analytical results will be presented in tabular form and a brief narrative summary will be included in the text of the report. The report will be prepared as a draft for review by the DEQ. Upon receipt and review of DEQ's comments, a Final Report will be issued.

The XPA Summary Report will discuss: 1) the rationale for the sampling program and methods used to implement it; 2) analytical results; and 3) additional site information obtained during the XPA investigation. The XPA Summary Report will also include information on sampling objectives, field procedures, analytical QA/QC, and any deviations to the work plan.

The report will follow a general outline:

Section 1.0, Introduction, which will include information about the site, location, who performed the work, for whom the work was performed, and under what authority.

Section 2.0, Site Background, which will include a brief description of the physical characteristics of the site and immediately adjacent areas, current and historical use, and apparent problems at the site, such as all areas where hazardous substances are known or suspected to have been released.

Section 3.0, Sampling Objectives, which will summarize the objectives of the sampling event, including media sampled, sampling objectives, data gaps to be completed, and information to be gained.

Section 4.0, Sampling Activities Performed, which will describe all sampling activities performed including any deviations to the work plan. The following information for each media as appropriate will be included: 1) sample locations and numbers; 2) sample type; 3) depth or elevation of sample interval; 4) physical description; 5) sampling procedures, construction details, and tools used; 6) weather; and 7) any deviations to the work plan.

Section 5.0, Sampling Results, which will include a brief narrative summary of all analytical data categorized by media and a summary of data quality and usability. Analytical data will be presented in tabular form and all summary data and data validation reports (see Section 7.5.2) will be included as appendices.

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Section 6.0, Other Data Collected, which will present other incidental site information gathered, such as conversations with site personnel and/or local residents, observation of current operations and deliveries, etc.

Section 7.0, Summary and Conclusions, which will summarize the results of the XPA investigation and whether the information indicates that the Marine Finance site is releasing, has released, or could release hazardous substances to the environment.

Section 8.0, References, which will include citations to all documents and information referenced in the XPA Summary Report.

Tables included in the XPA Summary Report will include summary analytical data for each media and analytical data reported above the detection limits (hits table). Figures will include a site location map and sample location maps for each media as appropriate.

Appendices will include photographs, background documentation (e.g., sample collection forms, boring logs, logbook entries, field notes), analytical data summary reports and validation reports, and IDW management documentation.

10.0 SCHEDULE

The work schedule proposed for field activities and report preparation, including the initial technical coordination and utility clearance activities, is presented below. Certain assumptions have been made concerning the duration of the fieldwork, laboratory turnaround time and report presentation. Variations from these assumptions could result in increased or decreased time in the work schedule. As work progresses, the Project Manager will continually revise the schedule and update the DEQ regarding the project status.

Marine Finance XPA Schedule

1.	Submit Revised Final Work Plan	05 July 2000
2.	Submit budget and assumptions proposal (BAP)	30 June 2000
3.	DEQ approves Final Work Plan and BAP issues Notice to Proceed	21 July 2000
4.	DEQ and Jacobs obtain site access agreements, utility clearance, conduct initial technical coordination and preparation for field work	17 July through 28 July 2000
5.	Perform Field Work	31 July through 11 August 2000
5.6.	Perform Field Work Laboratory Analysis due (30 day turnaround)	, ,
		2000
6.	Laboratory Analysis due (30 day turnaround)	2000 12 September 2000

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Table 2-1

Results Above Portland Harbor Baseline Maximum Values
Portland Harbor Sediment Study

		ocation			
Analyte (units)	SD055 (downstream)	SD055-C (Marine	SD057 (upstream)	SD057-C (upstream)	Portland Harbor Sediment Baseline
		Finance)			Maximum Value
Copper (ppm)	18.8	64	37.8	36.8	60
Lead (ppm)	9	31	9	16	30
Mercury (ppm)	0.02	0.13	0.04	0.15	0.1
Nickel (ppm)	17.3	33	28	28.1	32
Zinc (ppm)	67.3	178	89.6	91.3	118
2-Methylnaphthalene (ppm)	<19	1400	45	60	150
Benzoic Acid (ppm)	<190	<1900	<190	240	<200
Carbazole (ppm)	31	370	210	34	100
Dibenzofuran (ppm)	<19	1300	52	32	100
Total LPAHs (ppm)	212	69410	932	3447	700
Total HPAHs (ppm)	1750	136300	2085	18950	2400
TOC (%)	1	2.2	1.2	1.2	2
Water Depth (ft)	23	23	13	13	
Sample Depth (cm)	0-10	0-90	0-10	0-90	

(DEQ, September 1999)

Note: Bolded values exceed the Portland Harbor Sediment Baseline Maximum Value.

Table 6-1
Summary of Samples and Laboratory Analyses
Marine Finance, Portland, Oregon

Matrix	Analysis	Method Reference	Rationale ¹
Soil			Current drum storage area and near north end of former structure also used as material staging area. Contents and potentially released materials are unknown.
Water	TPH (diesel), VOC, SVOC, metals ²	SW8270C, SW6010B	Same as for SB-1. Looking for indications that releases in soil are leaching into groundwater and potentially migrating to the Willamette River.
Soil	TPH (diesel), VOC, SVOC, PCB, metals ²		Former location of a structure that was demolished in the early 1960s. Operations and storage within the building are unknown. The foundation was later used for staging of other unknown materials.
Water	TPH (diesel), VOC, SVOC, metals ²		Same as for SB-2. Looking for indications that releases in soil are leaching into groundwater and potentially migrating to the Willamette River.
Soil	TPH (diesel and gasoline), VOC, SVOC, PCB	NWTPH-Dx, NWTPH-Gx, SW5035 ³ /8260B, SW8270C, SW8082	Former gasoline and diesel USTs were located in this area. Also, releases and/or disposal of hazardous substances from the Quonset hut are possible near the bay door based on field observations during the site walk.
Water	VOC, SVOC	SW8260B, SW8270C	Same as for SB-3. Looking for indications that releases in soil are leaching into groundwater and potentially migrating to the Willamette River.
Soil	TPH (diesel)	NWTPH-Dx	A former 20,000-gallon diesel UST was located in this area.
Water .	VOC, SVOC	SW8260B, SW8270C	Same as for SB-4. Looking for indications that releases in soil are leaching into groundwater and potentially migrating to the Willamette River.
Soil		NWTPH-Dx, SW5035 ³ /8260B, SW8270C, Krone method, SW6010B	Metal storage in the region as well as a fuel line adjacent to the dock.
Water	TPH (diesel), VOC, SVOC, metals ²	NWTPH-Dx, SW8260B, SW8270C, SW6010B	Same as for SB-5. Looking for indications that releases in soil are leaching into groundwater and potentially migrating to the Willamette River.
Water	VOC, SVOC, metals ²	SW8260B, SW8270C, SW6010B	Area used for general storage, also downgradient from possible contamination sources.
Water	VOC, SVOC, metals ²	SW8260B, SW8270C, SW6010B	Area used for general storage, also downgradient from possible contamination sources.
	Soil Water Soil Water Soil Water Water Water	Soil TPH (diesel), VOC, SVOC, PCB, metals² Water TPH (diesel), VOC, SVOC, metals² Soil TPH (diesel), VOC, SVOC, PCB, metals² Water TPH (diesel), VOC, SVOC, metals² Soil TPH (diesel and gasoline), VOC, SVOC, PCB Water VOC, SVOC Soil TPH (diesel) Water VOC, SVOC Soil TPH (diesel) Water VOC, SVOC Water VOC, SVOC Water VOC, SVOC Water VOC, SVOC, metals²	Soil TPH (diesel), VOC, SVOC, PCB, metals² SW8270C, SW8082, SW6010B

Table 6-1
Summary of Samples and Laboratory Analyses
Marine Finance, Portland, Oregon

Sample Identification	Matrix	Analysis	Method Reference	Rationale ¹
SS-1	Soil	TPH (diesel), VOC, SVOC, PCB, TBT, metals ²	NWTPH-Dx, SW5035 ³ /8260B, SW8270C, SW8082, Krone method, SW6010B	Current drum storage area and near north end of former structure also used as material staging area. Contents and potentially released materials are unknown.
SS-2	Soil	TPH (diesel), VOC, SVOC, PCB, TBT, metals ²	NWTPH-Dx, SW5035 ³ /8260B, SW8270C, SW8082, Krone method, SW6010B	Near south end of former structure area which was also used as material staging area after the building was demolished. Contents and potentially released materials are unknown.
SS-3	Soil	TPH (diesel), SVOC, PCB, metals ²	NWTPH-Dx, SW8270C, SW8082, SW6010B	Former scrap metal storage area and oil stain.
SS-4	Soil	TPH (diesel), PCB, metals ²	NWTPH-Dx, SW8082, SW6010B	Former scrap metal storage area.
SS-5	Soil	TPH (diesel), SVOC, metals ²	NWTPH-Dx, SW8270C, SW6010B	Near bay door of Quonset hut where unknown hazardous substances may have been released and/or discharged. Area was noted to have soil stains and poor housekeeping during the site visit.
SS-6	Soil	TPH (diesel), VOC, SVOC, PCB, metals ²	NWTPH-Dx, SW5035 ³ /8260B, SW8270C, SW8082, SW6010B	Near drum storage and area was noted to have soil stains and poor housekeeping during the site visit.
SS-7	Soil	TPH (diesel), VOC, SVOC, TBT, metals ²	NWTPH-Dx, SW5035 ³ /8260B, SW8270C, Krone method, SW6010B	Near area where disposal of carboys was noted during the site visit. Contents of the carboys and other discharged containers and materials are unknown.
SS-8	Soil	TPH (diesel), VOC, SVOC, PCB, metals ²	NWTPH-Dx, SW5035 ³ /8260B, SW8270C, SW8082, SW6010B	Near area where ODOT has materials staged and area where previous unauthorized dumping may have occurred.
SS-9	Soil	VOC, SVOC, TBT, metals ²	SW5035 ³ /8260B, SW8270C, Krone method, SW6010B	Discretionary sample will be collected based on field observations
SS-10	Soil	SVOC, Metal	SW8270C, SW6010B	Discretionary sample will be collected based on field observations
SS-11	Soil	SVOC, Metal	SW8270C, SW6010B	Discretionary sample will be collected based on field observations

Table 6-1
Summary of Samples and Laboratory Analyses
Marine Finance, Portland, Oregon

Marine Finance, Portland, Oregon										
Sample Identification	Matrix	Analysis	Method Reference	Rationale ¹						
SD-1 (0-30cm)	Sediment	TPH (diesel), TPH (HCID), SVOC, PCB, TBT, metals ² , TOC, total solids and grain size, water content	NWTPH-Dx, NWTPH-HCID, SW8270C, SW8082, Krone method, SW6010B, SW9060, ASTM D422, ASTM D2216	Seep downgradient of an area that was noted to have discarded carboys with unknown contents and soil staining.						
SD-2 (0-30cm)	Sediment	TPH (diesel), TPH (HCID), SVOC, TBT, metals ² , TOC, total solids and grain size, water content	NWTPH-Dx, NWTPH-HCID, SW8270C, Krone method, SW6010B, SW9060, ASTM D422, ASTM D2216.	Sediment carried off of the site by stormwater runoff from areas of drum and materials storage as well as from historic use of the northern pier currently used by Mark Even Construction.						
(30-90cm)	Sediment	TPH (diesel), TPH (HCID), SVOC, TBT, metals ² , TOC, total solids and grain size, water content	NWTPH-Dx, NWTPH-ID, SW8270C, Krone method, SW6010B, SW9060, ASTM D422, ASTM D2216.	Sediment carried off of the site by stormwater runoff from areas of drum and materials storage as well as from historic use of the northern pier currently used by Mark Even Construction.						
SD-3 (0-30cm)	Sediment	TPH (diesel), TPH (HCID), SVOC, PCB, TBT, metals ² , TOC, total solids and grain size, water content	NWTPH-Dx, NWTPH-HCID, SW8270C, SW8082, Krone method, SW6010B, SW9060, ASTM D422, ASTM D2216.	Sediment carried off of the site by stormwater runoff from areas of scrap metal and materials storage, releases from the fuel line, as well as from historic use of the middle pier						
(30-90cm)	Sediment	TPH (diesel), TPH (HCID), SVOC, PCB, TBT, metals ² , TOC, total solids and grain size, water content	NWTPH-Dx, NWTPH-HCID, SW8270C, SW8082, Krone method, SW6010B, SW9060, ASTM D422, ASTM D2216.	Sediment carried off of the site by stormwater runoff from areas of scrap metal and materials storage, releases from the fuel line, as well as from historic use of the middle pier						
SD-4 (0-30cm)	Sediment	TPH (diesel), TPH (HCID), SVOC, PCB, TBT, metals ² , TOC, total solids and grain size, water content	NWTPH-Dx, NWTPH-HCID, SW8270C, SW8082, Krone method, SW6010B, SW9060, ASTM D422, ASTM D2216.	Sediment carried off of the site by stormwater runoff from areas of drum and materials storage as well as from historic use of the southern pier currently used by Hendren Tow Boat.						
(30-90cm)	Sediment	TPH (diesel), TPH (HCID), SVOC, PCB, TBT, metals ² , TOC, total solids and grain size, water content	NWTPH-Dx, NWTPH-HCID, SW8270C, SW8082, Krone method, SW6010B, SW9060, ASTM D422, ASTM D2216.	Sediment carried off of the site by stormwater runoff from areas of drum and materials storage as well as from historic use of the southern pier currently used by Hendren Tow Boat.						

Table 6-1

Summary of Samples and Laboratory Analyses Marine Finance, Portland, Oregon

Sample Identification	Matrix	Analysis	Method Reference	Rationale ¹
SD-5 (0-30cm)	Sediment	(HCID), SVOC, PCB, TBT, metals ² ,	SW8270C, SW8082, Krone	Downstream from historic use of the southern pier currently used by Hendren Tow Boat.
(30-90cm)	Sediment	(HCID), SVOC, PCB, TBT, metals ² ,		Downstream from historic use of the southern pier currently used by Hendren Tow Boat.
SD-6 (0-30cm)	Sediment	TPH (diesel), TPH (HCID), SVOC, PCB, TBT, metals ² , TOC, total solids and grain size, water content	NWTPH-Dx, NWTPH-HCID, SW8270C, SW8082, Krone method, SW6010B, SW9060, ASTM D422, ASTM D2216.	Baseline sample collected upstream from the Marine Finance site.
(30-90cm)	Sediment	TPH (diesel), TPH (HCID), SVOC, PCB, TBT, metals ² , TOC, total solids and grain size, water content	NWTPH-Dx, NWTPH-HCID, SW8270C, SW8082, Krone method, SW6010B, SW9060, ASTM D422, ASTM D2216.	Baseline sample collected upstream from the Marine Finance site.
SW-1	Water	VOC, SVOC, metals ²	SW8260B, SW8270C, SW6010B	Seep downgradient of an area that was noted to have discarded carboys with unknown contents and soil staining.
SW-2	Water	VOC, SVOC, metals ²	SW8260B, SW8270C, SW6010B	Discharge from a drainage pipe coming from an area that was noted to have discarded carboys with unknown contents and soil staining.
SWO-3 ⁴	Water	VOC, SVOC, metals ²	SW8260B, SW8270C, SW6010B	Sample of opportunity during storm event.

^{1 -} see also Section 5.0 for detailed rationale.

^{2 -} priority pollutant metals (SW6010 list): Sb, As, Be, Cd, Cr, Co, Cu, Pb, Hg, Ni, Se, Ag, Th, Zn.

^{3 -} soil samples for SW5035/8260B will be collected with an EnCore® sampler.

^{4 –} surface water sample of opportunity may be collected from storm water runoff during a storm event.

^{*}Sufficient sample volume will be collected for the laboratory to perform matrix spike/matrix spike duplicate (MS/MSD) analysis for QA/QC purposes at 1 soil location and 1 groundwater location.

Table 6-2
Sample Quantity Summary
Marine Finance, Portland, Oregon

Matrix	Analytic Method	Investigation		TOTAL				
		Samples	Dup Rinsates		Trip Blank	MS/MSD ¹		
Soil	TPH – NWTPH-Dx	13	1	0	NA	2	16	
	TPH – NWTPH - Gx	1	0	0	NA	0	1	
	VOC - SW5035/8260B	10	1	0	NA	2	13	
	SVOC – SW8270C	14	1	0	NA	2	17	
	PCB - SW8082	9	1	0	NA	2	12	
	TBT - Krone method	5	0	0	NA	0	5	
	Metals – SW6010	14	1	0	NA	2	17	
Sediment	TPH – NWTPH-Dx	11	1	1	NA	2	15	
	TPH – NWTPH-HCID	11	0	0	NA	0	11	
	SVOC - SW8270C	11	1	1	NA	2	15	
	PCB - SW8082	9	1	1	NA	2	13	
	Metals – SW6010	11	1	1	NA	2	15	
	TBT - Krone method (Krone et al, 1989)	11	1	1	NA	2	15	
	TOC - SW9060	11	0	0	NA	0	11	
	Water Content - ASTM D2216	11	0	0	NA	0	11	
	Soil Classification - ASTM D422	11	0	0	NA	0	11	
Water ²	TPH - NWTPH-Dx	3	1	0	NA	0	4	
	VOC – SW8260B	10	1	0	3	0	14	
	SVOC - SW8270C	10	1	0	NA	0	11	
	Metals - SW6010B	8	1	0	NA	0	9	

^{1 -} MS/MSD samples are counted as 2 samples per MS/MSD set (i.e. one MS and one MSD)

^{2 -} MS/MSD and equipment rinsate samples will not be collected for analysis because these groundwater data are considered screening level data.

Table 6-3
Sample Containers, Holding Times, and Preservatives
Marine Finance, Portland, Oregon

Analytical Method	Matrix	Sample Container	Preservative	Hold Time (days) (extract / analysis	Number of Containers Required ¹
VOC – SW8260B	Soil	3 x EnCore® Sampler ²	4°C	48 hours	48
	Water	3 x 40 ml vials	HCl, 4°C	14	46
SVOC – SW8270C	Soil/Sed	1 x 125 ml glass jar	4°C	14/40	34
	Water	2 x 1 liter amber glass	4°C	7/40	24
TPH – NWTPH-Dx	Soil/Sed	1 x 125 ml glass	4°C	28	34
	Water	1 x 1 liter amber glass	4°C	28	5
TPH – NWTPH-Gx	Soil	1 x 125 ml glass	4°C	28	1
PCB - SW8082	Soil/Sed	1 x 250 ml glass jar	4°C	14/40	28
TBT - Krone method	Soil/Sed	1 x 125 ml glass	4°C	180	22
Metals	Soil/Sed	1 x 250 ml glass jar	4°C	180	35
	Water	1 x 500 ml poly	4°C, HNO ₃	180	10
TOC - SW9060	Sed	1 x 125 ml glass	4°C	7	12
Water Content	Sed	1 x 125 ml glass	NA	NA	12
Soil Classification	Sed	1 x 125 ml glass	NA	NA	12

Notes:

 $1-Includes \, 5\%$ extra for poly containers and 10% for glass.

^{2 -} Required 3 x EnCore samplers per analysis (EnCore samplers used for SW5035 instead of methanol preservation).

Table 7-1

Analytical Procedures Summary
Marine Finance, Portland, Oregon

Analyte	Media	Analytical Method	Quantitation Limit	Accuracy (%R)	Precision (RPD)	Completeness (%)
Metals	Soil	USEPA SW6010B	0.1 – 20 mg/kg	80-120	<35	>95
	Water	USEPA SW6010B	0.1 – 20 mg/L	80-120	<35	>95
VOCs	Soil	USEPA SW8260B	0.1-30 μg/kg	Analyte Specific	<20	>95
	Water	USEPA SW8260B	0.1-30 μg/L	Analyte Specific	<20	>95
SVOCs	Soil	USEPA SW8270C	10-200 μg/kg	Analyte Specific	<20	>95
	Water	USEPA SW8270C	10-200 μg/L	Analyte Specific	<20	>95
PCB	Soil	USEPA SW8082	10-200 μg/kg	Analyte Specific	<20	>95
ТВТ	Soil/Sed	Krone method	0.1-30 μg/kg	80-120	<35	>95
TOC	Soil	USEPA 9060	50 mg/kg	80-120	<35	>95
TPH-Diesel	Soil	NWTPH-Dx	25 mg/kg	80-120	<35	>95
	Water	NWTPH-Dx	25 mg/L	80-120	<35	>95
TPH-Gasoline	Soil	NWTPH-Gx	25 mg/kg	80-120	<35	>95

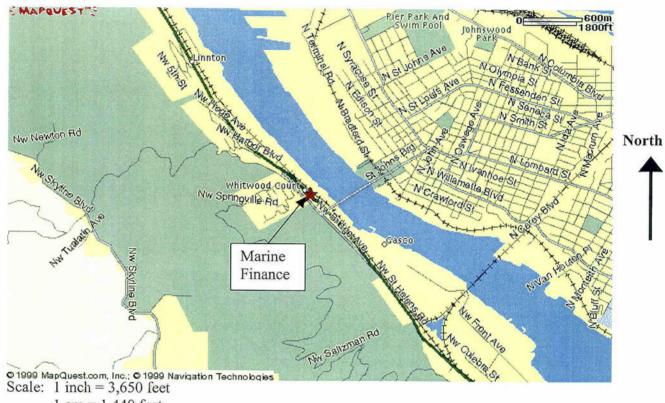
Notes:

R = Percent recovery

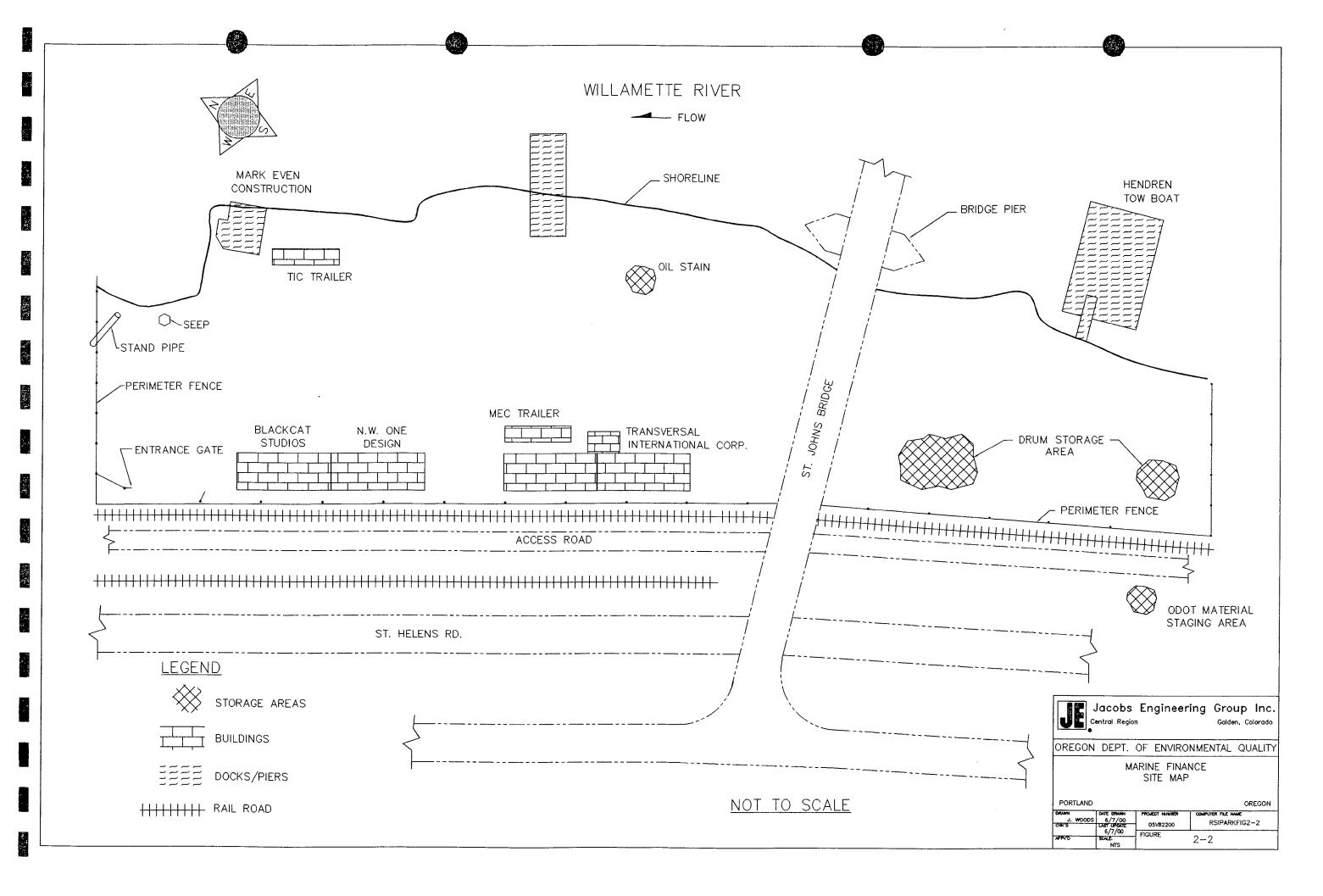
RPD = relative percent difference

Figure 2-1

Marine Finance Site
Portland, Oregon



Scale: 1 inch = 3,650 feet 1 cm = 1,440 feet1 cm = 440 m



APPENDIX A Historical Aerial Photographs

Figure A-1 U.S. Army Corps of Engineers, 1936

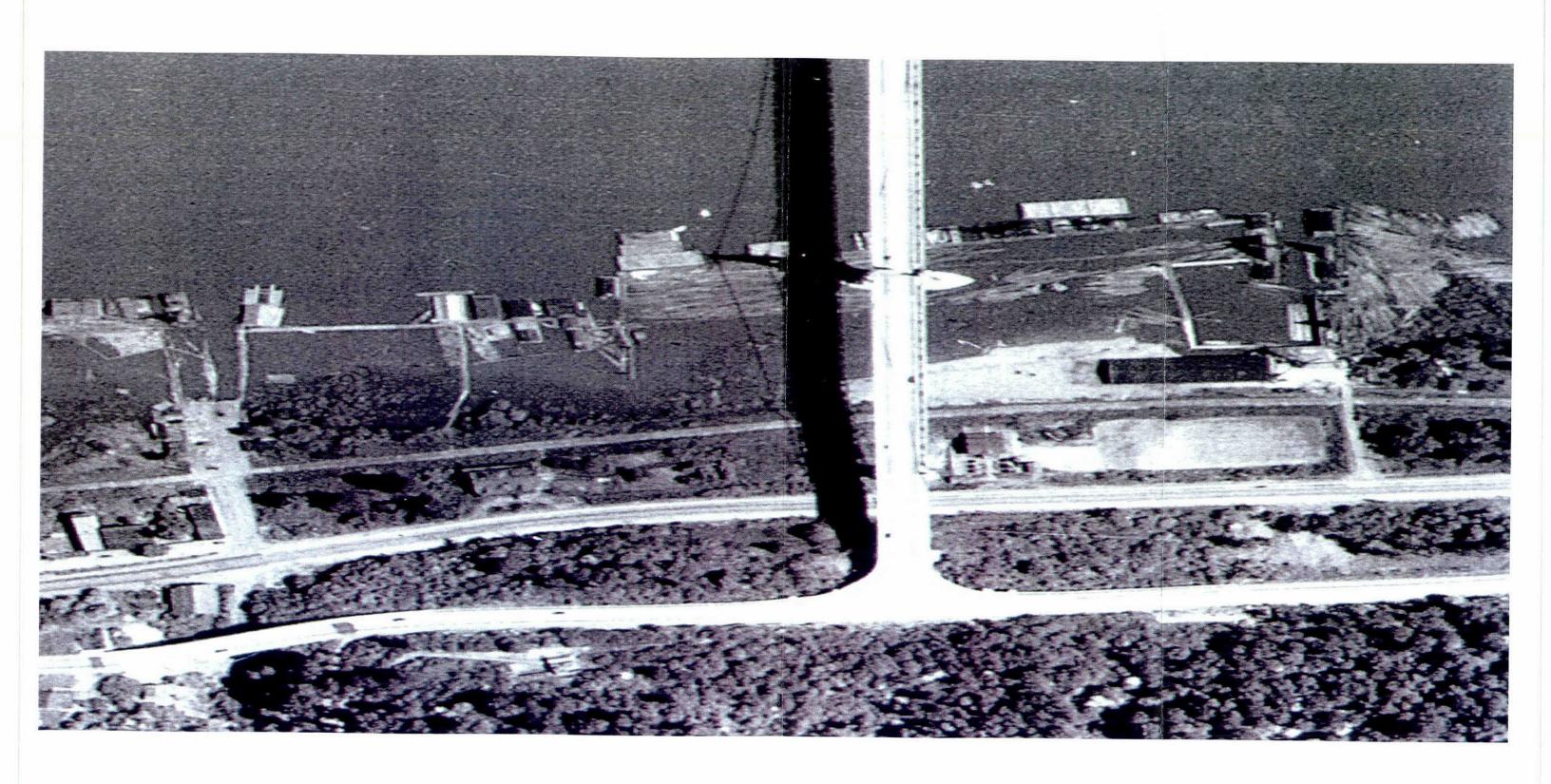


Figure A-2 U.S. Army Corps of Engineers, 1957

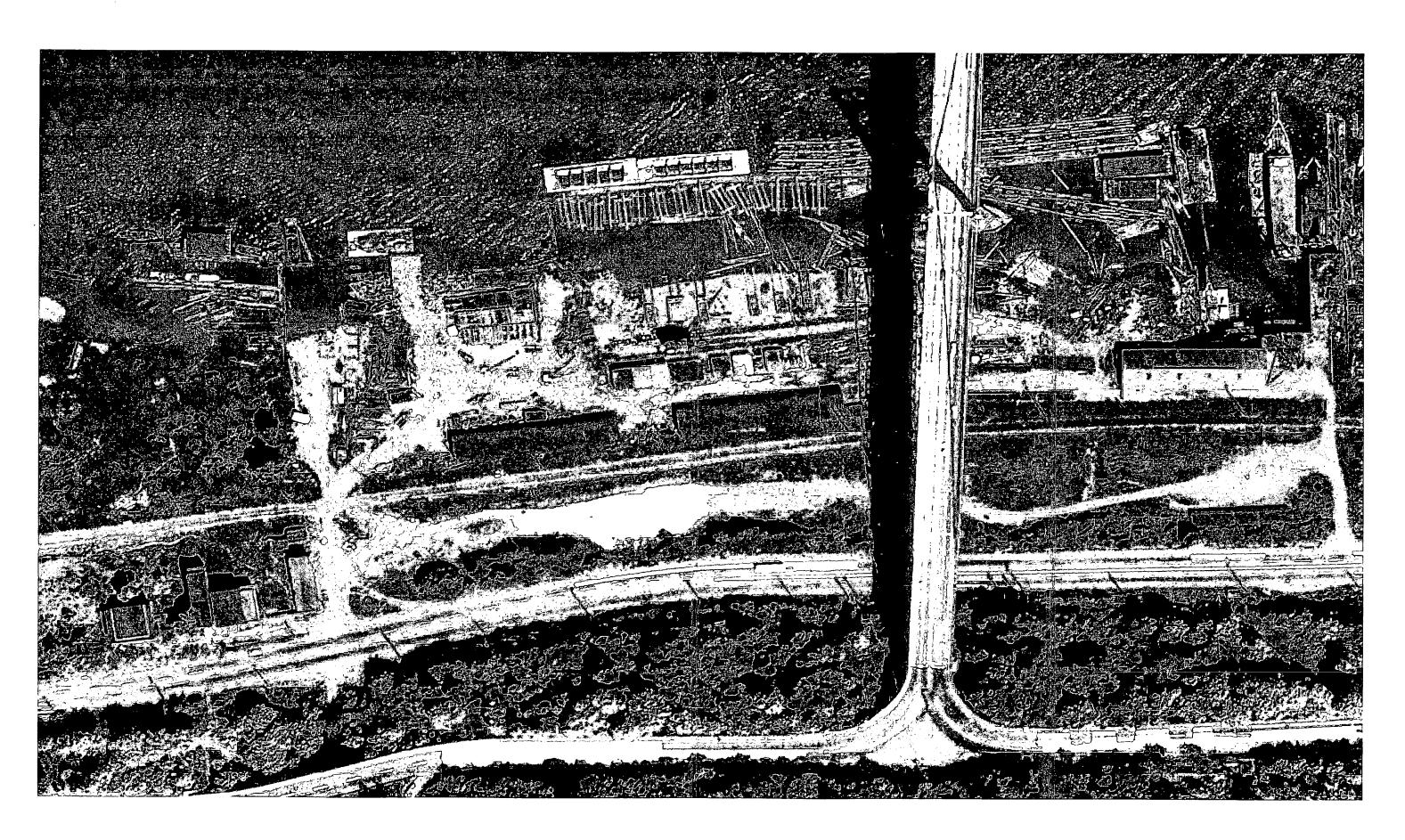


Figure A-3 U.S. Army Corps of Engineers, 1972

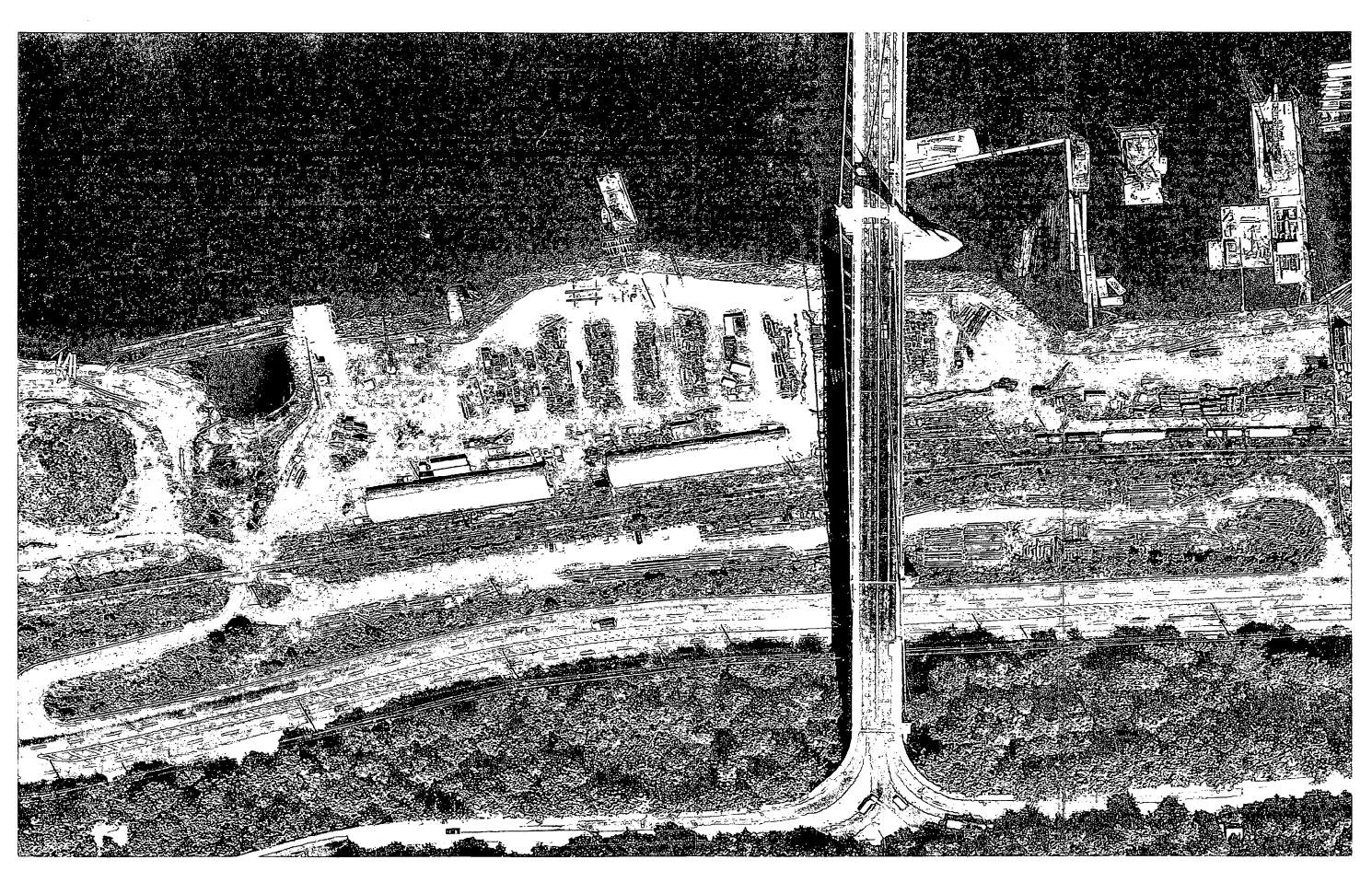


Figure A-4 U.S. Army Corps of Engineers, 1981

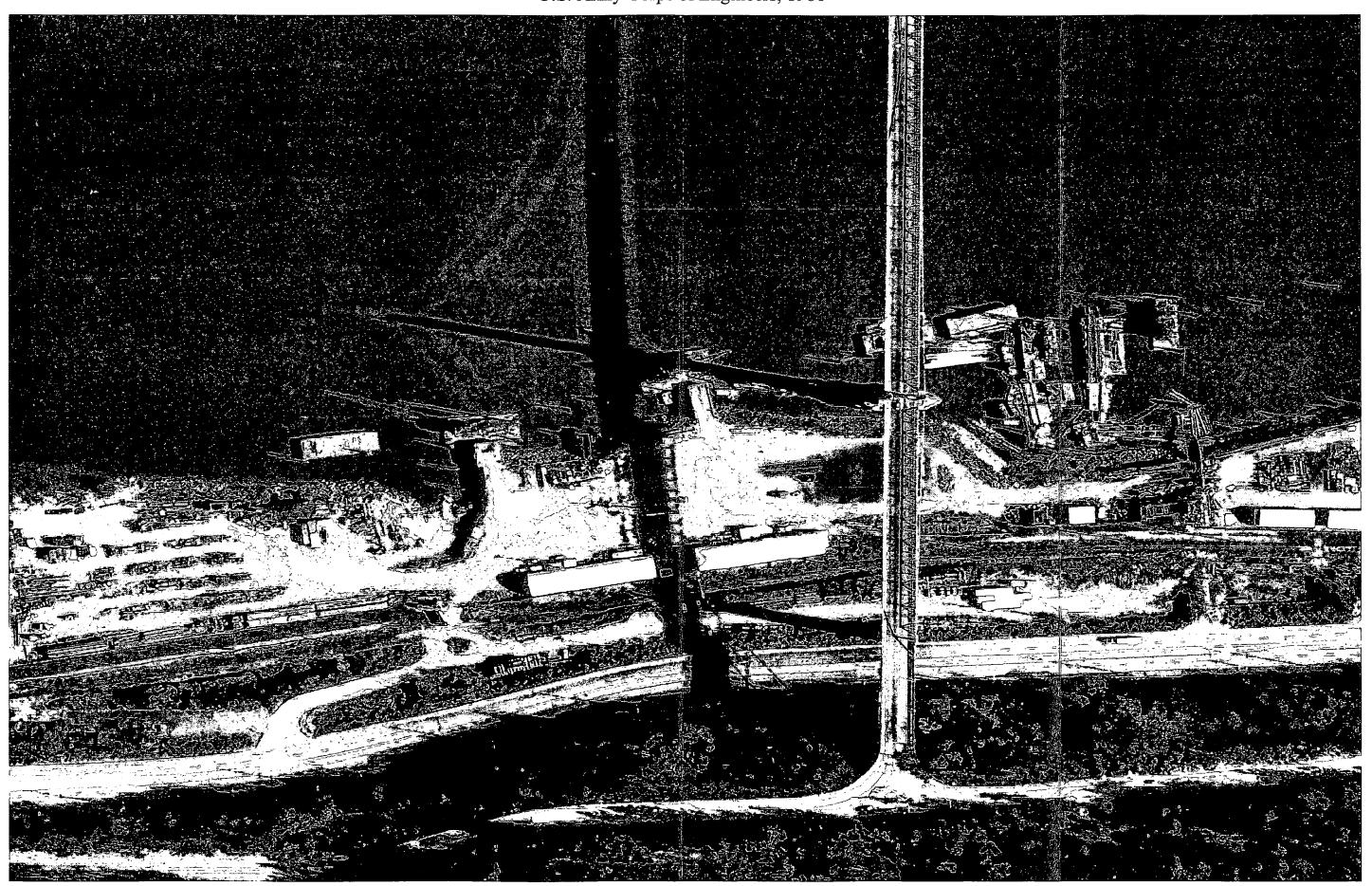
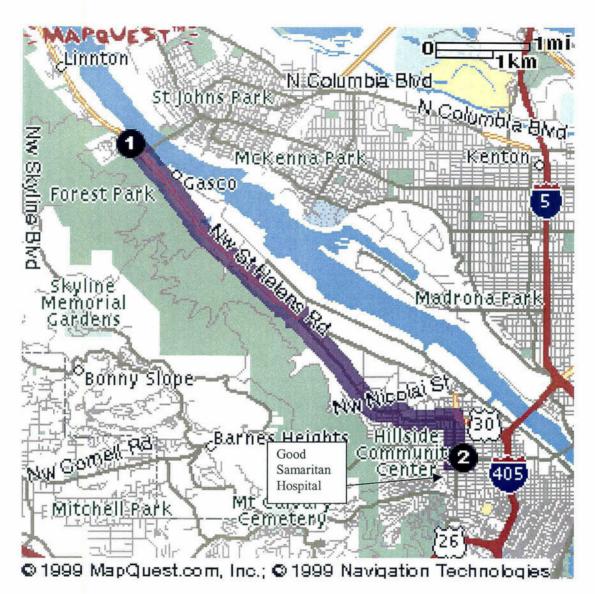


Figure D-1 Hospital Route Map



	Directions	Miles
1.	Start out going Southeast on NW ST HELENS RD/US-30 towards NW 31ST AVE by turning left.	4.3
2.	NW ST HELENS RD/US-30 becomes NW NICOLAI ST/US-30.	0.1
3.	Turn SLIGHT RIGHT onto NW WARD WAY.	0.1
4.	NW WARD WAY becomes NW VAUGHN ST.	0.5
5.	Turn RIGHT onto NW 23RD AVE.	0.5
6.	Turn LEFT onto NW LOVEJOY ST.	0.1
7.	Turn LEFT onto NW 22ND AVE.	0.0

Figure A-5 U.S. Army Corps of Engineers, 1998



SITE ASSESSMENT REPORT

SITE INVENTORY

100			1	N			В		널리	С	- 50	E)	
MAP ID	PROPERTY AND THE ADJACENT AREA (within 1/8 mile)	VISTA ID DISTANCE DIRECTION		CORRACTS(TSD)	SCL	CERCLIS/NFRAP	TSD	LUST	SWLF	UST	ERNS	LG GEN	SM GEN	SPILLS
1	MARINE FINANCE CORP 8444 NW SAINT HELENS RD PORTLAND, OR 97231	13488923 0.00 MI NA			x									-
1	REH, INC. 8444 NW ST HELENS ROAD PORTLAND, or 97229	2757850 0.00 MI NA						x		x				
1	TRANSLOADER INTERNATIONAL COMPANY 8444 NW SAINT HELENS RD PORTLAND, OR 97231	64529189 0.00 MI NA			x						-			
2	DOANE LAKE STUDY AREA 1N/1W/S13 12 PORTLAND, OR 97210	3089842 0.12 M/ NA			x									

			. A		2.2	أوللاوا	В		С		D	
MAP ID	SITES IN THE SURROUNDING AREA (within 178 - 174 mile)	VISTA ID DISTANCE DIRECTION	NP	CORRACTS(TSD)	CI	CERCLIS/NFRAP	ISD LUST	SWLF	UST	ERNS	IG GEN	SM GEN SPILLS
3	FOSS MARITIME 9030 NORTHWEST ST HELENS RD PORTLAND, OR 97231	5684747 0.24 MI NW							x	•		•

			A.		44	В		С	1	· · · · [D)	1.00
MAP ID	SITES IN THE SURROUNDING AREA (within 1/4 - 1/2 mile) VISIA DISTANCE DIRECTION	티굽	CORRACTS(TSD)	Sol	CERCLIS/NFRAP	TSD	LUSI	SWLT.	ERNS	LG GEN	SM GEN	SPILLS
4	(b) (6) 116514 0.321 PORTLAND, or 97231	11				,	x	-				
5	BES WATER POLLUTION CONTROL LABORATO 6543 N BURLINGTON PORTLAND, OR 97203 6452950 0.38 /	- 1		x								



X = search criteria; • = tag-along (beyond search criteria).
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			A B						С			D		
MAP ID	SITES IN THE SURROUNDING AREA (within 1/4 - 1/2 mile) VISTA II DISTANCE DIRECTION	NPL	CORRACTS(TSD)	los l	CERCLIS/NFRAP	TSD	LUST	SWLF	UST	ERNS	LG GEN	SM GEN	SPILLS	
6	MAR COM INC. 1088367. 8970 N BRADFORD ST 0.44 N PORTLAND, OR 97203	7		x										
6	RIVERSIDE LUMBER CO. 9020 N BRADFORD ST PORTLAND, OR 97203	// -					х		•				-	
7	STENNO CARBON COMPANY 6600 N ST LOUIS PORTLAND, or 97203	II E					X		•					
7	BBS PROPERTY 189284 9175 N BRADFORD 0.49 M PORTLAND, or 97203	1/					X						_	
8	CRAWFORD STREET CORPORATION 8424 N CRAWFORD ST PORTLAND, OR 97203			х									_	
MAP ID	SITES IN THE SURROUNDING AREA (within 1/2 - 1 mile)		CORRACTS(TSD)		CERCLIS/NFRAP	В			c		D			
	VISTA I DISTANC		ORRA	 ਹੁ	ERCLI	CS	UST	SWLF	UST	ERNS	G GEN	SM GEI	SPILLS	

No Records Found



X = search criteria; • = tag-along (beyond search criteria).
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Report ID: 564801901

Version 2.6.1

Date of Report: April 19, 2000

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		-		В		c			D				
UNMAPPED SITES	VISIA ID	P	RRACTS(TSD)	CCI	CERCLIS/NFRAP		LUST	SWLF	UST	ERNS	GEN	SM GEN	SPILLS
BN RR - PORTLAND #347	. 738600												
MP 0.0 LS 47 2ND SUB							١,		X				
PORTLAND, OR	4962432		Н				<u> </u>				-		-
BN RR - N PORTLAND JCT 348 MP 8 LS 47 2ND SUB - N PORTLAND PORTLAND, OR	4962432								х				
ST. JOHNS - KEELER #2 RIGHT-OF-WAY	3725127				\neg								\neg
2N/1W/S35	•			x						-			
PORTLAND, OR 97203										-2			
BN RR - PORTLAND #349	1894197												
MP 2.8 LS 47 2ND SUB									Х				
PORTLAND, OR										-			
BLUE LAGOON - MARINE TERMINAL 5	11651672									-	-,	- 1	
N LOMBARD ST	•			X									.
PORTLAND, OR 97203	11051010			-	_					-		-	\dashv
(b) (6)	11651640						x					-	
PORTLAND, or 97203	40.405000				_				_			-	
LEGACY HEALTH SYSTEM HOT	62435890			١.,									
2733 N KIRBY	4.					ļ	X	. 1					
PORTLAND, or 97203	6038032						-		_				
WEST OREGON NURSERY 3550 NW SALTZMAN ROAD	0030032	' '			-					,			
PORTLAND, or 97210				- 1		- 1	Х			-		- }	
(b) (6)	12836077	-	$\overline{}$	\dashv	\dashv	\dashv		-	-	\dashv	\dashv	-	-
			- 1	l	Ì	-	х					ı	
PORTLAND, or 97229					- 1	ł	-`					İ	
ODOT REGION 1, PARCEL 1C HOT	12537309		\dashv						i.		\exists		\dashv
PARCEL 1C SE SALMAN			١		- 1		х						
PORTLAND, or			_										[
MT. ST. JOSEPH AHOT	501035230						х						
PORTLAND, or							^					,	
ALLISON AHOT	501035218		- 1				х						
PORTLAND, or	<u> </u>		_				^						
SALMON HOT	501035213		- 1			İ	х						-
PORTLAND, or					_ {		- 1						



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SITE ASSESSMENT REPORT

DETAILS

PROPERTY AND THE ADJACENT AREA (within 1/8 mile)

VISTA Address*:	MARINE FINANC 8444 NW SAINT I PORTLAND, OR 9	HELENS RD	VISTA ID#: Distance/Direction Plotted as:	13488923 0.00 MI / NA Point					
CL - State I	quivalent CERCLIS I		Agency ID:	2352					
Agency A		SAME AS ABOVE							
Status:		UNKNOWN							
Facility Type: Lead Agency: State Status:		NOT AVAILABLE	NOT AVAILABLE						
		NOT AVAILABLE	NOT AVAILABLE REQUIRES FURTHER INVESTIGATION						
		REQUIRES FURTHER INVESTIGA							
Pollutant 1:		OTHER							
Pollutant 2:		DIBENZOFURAN							
Pollutant 3	-	OTHER		<u> </u>					

VISTA	REH, INC				VISTA ID#:	2757850
Address*:		ST HELENS ROAL	D		Distance/Direction	
	1	ND, or 97229			Plotted as:	Point
STATE HIST -		cing Underground S	storage Tank / SR	C# 440	EPA/Agency ID:	N/A
Agency Ad			REH, INC. 8444 NW ST HELEN PORTLAND, or		•	
Leak ID#:			26-88-0046			
Case Close	ed Date:		17FEB1989			
Region / D	istrict:		NWR			CUD DATE 175501000
Description		ent:	REMEDIATION STA	RT DATE: 04A	UG1988REMEDIATION	
		erground Storage Ta	ank / SRC# 442		Agency ID:	11378
Agency A	ddress:		REH INC 8444 NW ST HELEN PORTLAND, OR 97			
Undergrou	ind Tanks:		3			•
Abovegro	und Tanks:		NOT REPORTED			
Tanks Rem			NOT REPORTED			
Tank ID:		001U	Tai	nk Status:	CLOSED	
Tank Cont	ents:	DIESEL	Lea	ak Monito		1
Tank Age:		NOT REPORTED	Tai	nk Piping:	NOT AVAIL	ABLE
Tank Size (20000 (GALLONS)	Tai	nk Materia		
Tank ID:	·	002U	Tai	nk Status:	CLOSED	
Tank Cont	ents:	EMPTY	Lea	ak Monito	ring: NOT AVAIL	ABLE
Tank Age:		NOT REPORTED	Ta	nk Piping:	NOT AVAIL	ABLE
Tank Size		10000 (GALLONS)	Ta	nk Materia	il: STEEL	



* VISTA address includes enhanced city and ZIP.
For more information call VISTA Information Solutions, Inc. at 1 - 800 - 767 - 0403. Date of Report: April 19, 2000 Report ID: **564801901** *Version 2.6.1* Page #10

Map ID

1

MapID

PROPERTY AND THE ADJACENT AREA (within 1/8 mile) CONT.

Tank ID:

Tank Age:

003U

EMPTY

NOT REPORTED

Tank Status:

CLOSED

Leak Monitoring:

NOT A VAILABLE NOT A VAILABLE

Tank Size (Units):

Tank Contents:

5000 (GALLONS)

Tank Piping: Tank Material:

STEEL

Agency ID:

Plotted as:

Agency ID:

VISTA TRANSLOADER INTERNATIONAL COMPANY Address*: 8444 NW SAINT HELENS RD

PORTLAND, OR 97231

VISTA ID#. 64529189 Distance/Direction 0.00 ML/ NA Plotted as: Point

2367

MapID

SCL - State Equivalent CERCLIS List / SRC# 438

Agency Address:

Status:

Facility Type:

Lead Agency:

State Status: Pollutant 1:

Pollutant 2: Pollutant 3:

SAME AS ABOVE UNKNOWN

NOT AVAILABLE NOT AVAILABLE

REQUIRES FURTHER INVESTIGATION

UNKNOWN UNKNOWN

UNKNOWN

VISTA **DOANE LAKE STUDY AREA** Address*: 1N/1W/S13 12

PORTLAND, OR 97210

VISTA ID#: 3089842 Distance/Direction 0.12 MI / NA

Radius

36

2

MapID

SCL - State Equivalent CERCLIS List / SRC# 438

Agency Address:

Status:

Facility Type:

Lead Agency:

State Status:

Pollutant 1:

Pollutant 2: Pollutant 3:

SAME AS ABOVE

UNKNOWN NOT AVAILABLE

NOT AVAILABLE REQUIRES FURTHER INVESTIGATION

ARSENIC

LEADOTHER

SITES IN THE SURROUNDING AREA (within 1/8 - 1/4 mile)

VISTA **FOSS MARITIME** VISTA ID#: 5684747 Address*: 0.24 MI / NW Distance/Direction 9030 NORTHWEST ST HELENS RD Plotted as: Point PORTLAND, OR 97231 STATE UST - State Underground Storage Tank / SRC# 442 7374 Agency ID:

MapID 3

Agency Address:

Tanks Removed:

FOSS MARITIME

9030 NW ST HELENS RD PORTLAND, OR 97203

Underground Tanks:

Aboveground Tanks:

NOT REPORTED

NOT REPORTED



* VISTA address includes enhanced city and ZIP.

For more information call VISTA Information Solutions, Inc. at 1 - 800 - 767 - 0403.

Report ID: 564801901

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Date of Report: April 19, 2000 Page #11

SITES IN THE SURROUNDING AREA (within 1/8 - 1/4 mile) CONT.

Tank ID:	10	Tank Status:	ACTIVE/IN SERVICE
Tank Contents:	DIESEL	Leak Monitoring:	NOT AVAILABLE
Tank Age:	20	Tank Piping:	NOT AVAILABLE
Tank Size (Units):	20000 (GALLONS)	Tank Material:	STEEL
Tank ID:	20	Tank Status:	ACTIVE/IN SERVICE
Tank Contents:	DIESEL	Leak Monitoring:	NOT AVAILABLE
Tank Age:	20	Tank Piping:	NOT AVAILABLE
Tank Size (Units):	20000 (GALLONS)	Tank Material:	STEEL
Tank ID:	3U	Tank Status:	CLOSED
Tank Contents:	OIL (NOT SPECIFIED)	Leak Monitoring:	NOT AVAILABLE
Tank Age:	20	Tank Piping:	NOT AVAILABLE
Tank Size (Units):	6000 (GALLONS)	Tank Material:	STEEL
Tank ID:	4U	Tank Status:	ACTIVE/IN SERVICE
Tank Contents:	OIL(NOT SPECIFIED)	Leak Monitoring:	NOT AVAILABLE
Tank Age:	20	Tank Piping:	NOT AVAILABLE
Tank Size (Units):	6000 (GALLONS)	Tank Material:	STEEL
Tank ID:	5U	Tank Status:	CLOSED
,	GASOLINE (UNSPECIFIED)	Leak Monitoring:	NOT AVAILABLE
Tank Contents:	20	Tank Piping:	NOT AVAILABLE
Tank Age:	2000 (GALLONS)	Tank Material:	STEEL
Tank Size (Units):	2000 (5: 222:39)	igin Material.	YV A.S.

SITES IN THE SURROUNDING AREA (within 1/4 - 1/2 mile)

VISTA (b) (6)		VISTA ID#:	11651460
Address*:		Distance/Direction	0.32 MI / NW
PORTLAND, or 97	/231	Plotted as:	Point
	rground Storage Tank / SRC# 440	EPA/Agency ID:	N/A
Agency Address:	SAME AS ABOVE		
Leak ID#:	26-98-0581		
Case Closed Date:	29DEC 1998		
Region / District:	NWR		
Description / Comment:	REMEDIATION START DATE: 25.	UL1998REMEDIATION END	DATE: 29DEC 1998



* VISTA address includes enhanced city and ZIP.
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Map ID

SITES IN THE SURROUNDING AREA (within 1/4 - 1/2 mile) CONT.

VISTA	BES WATER POLLUTION C	ONTROL LABORATO	VISTA ID#:	64529506	MapID
Address*:	6543 N BURLINGTON	Sianggale of Daliffordinate profit in the Signal of the first	Distance/Direction:	0.38 MI / E	
	PORTLAND, OR 97203		Plotted as:	Point	5
CL - State	Equivalent CERCLIS List / SRC#	438	Agency ID:	2452	ļ
Agency A	ddress:	BES WATER POLLUTION CON 6543 N BURLINGTON OR 97203 UNKNOWN	TROL LABORATO		
Status. Facility Typ	oe:	NOT AVAILABLE			
Lead Ager		NOT AVAILABLE			
State Statu	•	REQUIRES FURTHER INVESTIGA	ATION	*	
Pollutant 1	:	UNKNOWN			
Pollutant 2	:	UNKNOWN			
Pollutant 3	1	UNKNOWN			
Pollutant 2 Pollutant 3			Luca	Leonoro :	
VISTA Address*:	MAR COM INC. 8970 N BRADFORD ST		VISTA ID#: Distance/Direction Plotted as:	10883676 0.44 MI / NE Point	мар II

Address*:	8970 N BRADFORD ST PORTLAND, OR 97203		Distance/Directi Plotted as:	on: 0.44 MI./ Point	
SCL - State E	Equivalent CERCLIS List / S	RC# 438	Agency ID:	2350	
Agency Ac	ddress:	SAME AS ABOVE			-
Status:	4	UNKNOWN			
Facility Typ	oe:	NOT AVAILABLE	•		
Lead Agen	ісу:	NOT AVAILABLE			
State Status	s:	REQUIRES FURTHER INVESTIGA	ITION		
Pollutant 1:	;	OIL(NOT SPECIFIED)			• •
Pollutant 2:	:	UNKNOWN			
Pollutant 3:	1	UNKNOWN			

VISTA Address*:	RIVERSIDE LUMBER C 9020 N BRADFORD S PORTLAND, OR 9720	T	VISTA ID#: Distance/Direction: Plotted as:	732142 0.45 MI / NE Point	мар I 6
STATE LUST -	State Leaking Undergro	und Storage Tank / SRC# 440	EPA/Agency ID:	N/A	
Agency Ad	ddress:	RIVERSIDE LUMBER CO. 9020 N BRADFORD PORTLAND, or 97203 26-90-0272			
Case Close	ed Date:	31DEC1990			
Region / D	istrict:	NWR .			
Description	ı / Comment:	REMEDIATION START DATE: 01	AUG1990REMEDIATION END	DATE: 31DEC1990	

VISTA Address*:	STENNO CARBON CO 6600 N ST LOUIS PORTLAND, or 97203	MPANY	VISTA ID#: Distance/Direction: Plotted as:	399181 0.47 MI / NE Point	_ Map 7
STATE LUST -	State Leaking Undergroup	nd Storage Tank / SRC# 440	EPA/Agency ID:	N/A	L
Agency A	ddress:	SAME AS ABOVE			
Leak ID#:		26-90-0128			
Case Close	ed Date:	15JUN1990			
Region / D	istrict:	NWR		•	



* VISTA address includes enhanced city and ZIP.
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SITES IN THE SURROUNDING AREA (within 1/4 - 1/2 mile) CONT.

Description /	Comment:	REMEDIATION START DATE: 113	REMEDIATION START DATE: 11JUN1990REMEDIATION END DATE: 30OCT1990		
Address*:	BBS PROPERTY 0175 N BRADFORD PORTLAND, or 97203		Distance/Direction	1892840 0.49 MI / NE Point	
I i i i i i i i i i i i i i i i i i i i	The second secon	d Storage Tank / SRC# 440	EPA/Agency ID:	N/A	
Agency Add		SAME AS ABOVE 26-90-0129			
Case Closed	Date:	04AUG1989			
Region / Dist	rict:	NWR			
Description /	Comment:	REMEDIATION START DATE: 14.	JUL 1989REMEDIATION END	DATE: 19DEC1990	

VISTA CRAWFORD STI Address* 8424 N CRAWF PORTLAND, OR	그 사는 그 사는 경우님은 기위에게 하는 학교에 가장 하는 장교 병장 그 스타를 병 것은 역사 기계기	VISTA ID#: Distance/Direction Plotted as:	13488782 on: 0.50 MI / E Point
SCL - State Equivalent CERCLIS		Agency ID:	2363
Agency Address:	SAME AS ABOVE		
Status:	UNKNOWN		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Facility Type:	NOT AVAILABLE		•
Lead Agency:	NOT AVAILABLE		
State Status:	REQUIRES FURTHER INVESTIGA	ITION	
Pollutant 1:	LEAD		
Pollutant 2:	MERCURY.		
Pollutant 3:	DI-N-BUTYLPHTHALATE		

SITES IN THE SURROUNDING AREA (within	1/2 - 1 mile)	10: 10:
No Records Found		



* VISTA address includes enhanced city and ZIP.
For more information call VISTA Information Solutions, Inc. at 1 - 800 - 767 - 0403.
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Map ID

MapID

8

UNMAPPED SITES

VISTA	ST. JOHNS - KEELER #2 RIG	GHT-OF-WAY	VISTA ID#:	3725127
Address*:	2N/1W/S35 PORTLAND, OR 97203			
CL - State E	quivalent CERCLIS List / SRC#	439	Agency ID:	1067
Agency Ac	idress:	SAME AS ABOVE		
Status:		UNKNOWN		
Facility Typ	e:	NOTAVAILABLE		
Lead Agen	су:	NOTAVAILABLE		
State Status	S:	NOT AVAILABLE		
Pollutant 1:		PCBS		
Pollutant 2:		TPH		
		UNKNOWN		

CL - State Equivalent CERCLIS List / SRC# 438		Agency ID:	1686
Agency Address:	SAME AS ABOVE		-
Status:	UNKNOWN		
Facility Type:	NOT AVAILABLE		
Lead Agency:	NOT AVAILABLE		
State Status:	REQUIRES FURTHER INVI	ESTIGATION	
Pollutant 1:	CHROMIUM		
Pollutant 2:	PCB OTHER		
Pollutant 3:	UNKNOWN		

VISTA (b) (6) Address*: PORTLAND, o	r 97203	VISTA ID#	11651640
STATE LUST - State Leaking U	nderground Storage Tank / SRC# 440	EPA/Agency ID:	N/A
Agency Address:	SAME AS ABOVE		
Leak ID#:	26-99-0008		
Region / District:	NWR		

VISTA Address*:	LEGACY HEALTH SY 2733 N KIRBY PORTLAND, or 9720		VISTA ID#:	62435890							
STATE LUST -	State Leaking Undergro	ound Storage Tank / SRC# 440	EPA/Agency ID:	N/A							
Agency A	ddress:	SAME AS ABOVE									
Leak ID#:		26-99-0152									
Case Close	ed Date:	14MAY1999									
Region / D	istrict:	NWR									
Description	n / Comment:	REMEDIATION START DATE: 19F	REMEDIATION START DATE: 19FEB1999REMEDIATION END DATE: 14MAY1999								



* VISTA address includes enhanced city and ZIP.
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		- 121 11 122 123 123 123 123 123 123 123				
VISTA	WEST OREGON NURSE		VISTA ID#:	6038032		
	3550 NW SALTZMAN ROPORTLAND, or 97210	DAD				
TATE LUST - S		d Storage Tank / SRC# 440	EPA/Agency ID:	N/A		
Agency Ad		SAME AS ABOVE	The second second			
Leak ID#:		34-98-0891				
Region / Dis	strict:	NWR		·		
VISTA Address*:	(b) (6)	1	VISTA ID#:	12836077		
	PORTI AND or 97229					
		d Storage Tank / SRC# 440	EPA/Agency ID:	N/A		
Agency Ad		SAME AS ABOVE	-			
Leak ID#:		26-97-0941				
Case Close	d Date:	05FEB1998				
Region / Dis	strict:	NWR				
	/ Comment:	REMEDIATION START DATE: 10	DEC1997REMEDIATION ENL	DATE: 09FEB1998		
	ODOT REGION 1, PARC PARCEL 1C SE SALMA! PORTLAND, or State Leaking Undergroun		VISTA ID#: EPA/Agency ID:	12537309 N/A		
	state reaking ondergroun					
Agency Ad		SAME AS ABOVE		,		
-				.,		
Leak ID#:	dress:	SAME AS ABOVE	-	<i>J</i>		
Leak ID#: Region / Dis	dress:	SAME AS ABOVE 26-99-0181		DATE:		
Leak ID#: Region / Dis Description	dress: strict: / Comment: MT. ST. JOSEPH AHOT	SAME AS ABOVE 26-99-0181 NWR		DATE:		
Leak ID#: Region / Dis Description VISTA Address*:	dress: strict: / Comment: MT. ST. JOSEPH AHOT PORTLAND, or	SAME AS ABOVE 26-99-0181 NWR REMEDIATION START DATE: 04 d Storage Tank / SRC# 440	FEB1999REMEDIATION END	I - was a second second		
Leak ID#: Region / Dis Description VISTA Address*: TATE LUST - 9	dress: strict: / Comment: MT. ST. JOSEPH AHOT PORTLAND, or State Leaking Undergroun	SAME AS ABOVE 26-99-0181 NWR REMEDIATION START DATE: 04 d Storage Tank / SRC# 440 SAME AS ABOVE	FEB1999REMEDIATION END	501035230		
Leak ID#: Region / Dis Description VISTA Address*: TATE LUST - S Agency Ad	dress: strict: / Comment: MT. ST. JOSEPH AHOT PORTLAND, or State Leaking Undergroun	SAME AS ABOVE 26-99-0181 NWR REMEDIATION START DATE: 04 d Storage Tank / SRC# 440 SAME AS ABOVE 26-94-6001	FEB1999REMEDIATION END	501035230		
Leak ID#: Region / Dis Description VISTA Address*: TATE LUST - Agency Ad Leak ID#: Case Close	dress: strict: / Comment: MT. ST. JOSEPH AHOT PORTLAND, or State Leaking Undergroun dress: d Date:	SAME AS ABOVE 26-99-0181 NWR REMEDIATION START DATE: 04 d Storage Tank / SRC# 440 SAME AS ABOVE 26-94-6001 27MAR1997	FEB1999REMEDIATION END	501035230		
Leak ID#: Region / Dis Description VISTA Address*: TATE LUST -: Agency Ad Leak ID#: Case Close Region / Dis	dress: strict: / Comment: MT. ST. JOSEPH AHOT PORTLAND, or State Leaking Undergroun dress: d Date: strict:	SAME AS ABOVE 26-99-0181 NWR REMEDIATION START DATE: 04 d Storage Tank / SRC# 440 SAME AS ABOVE 26-94-6001 27MAR1997 NWR	VISTA ID# EPA/Agency ID:	501035230 N/A		
Leak ID#: Region / Dis Description VISTA Address*: TATE LUST -: Agency Ad Leak ID#: Case Close Region / Dis	dress: strict: / Comment: MT. ST. JOSEPH AHOT PORTLAND, or State Leaking Undergroun dress: d Date:	SAME AS ABOVE 26-99-0181 NWR REMEDIATION START DATE: 04 d Storage Tank / SRC# 440 SAME AS ABOVE 26-94-6001 27MAR1997	VISTA ID# EPA/Agency ID:	501035230 N/A		
Leak ID#: Region / Dis Description VISTA Address*: TATE LUST -: Agency Ad Leak ID#: Case Close Region / Dis Description	dress: strict: / Comment: MT. ST. JOSEPH AHOT PORTLAND, or State Leaking Undergroun dress: d Date: strict: / Comment:	SAME AS ABOVE 26-99-0181 NWR REMEDIATION START DATE: 04 d Storage Tank / SRC# 440 SAME AS ABOVE 26-94-6001 27MAR1997 NWR	VISTA ID# EPA/Agency ID:	501035230 N/A		
VISTA Address*: Agency Ad Leak ID#: Case Close Region / Dis Description VISTA Address*:	dress: strict: / Comment: MT. ST. JOSEPH AHOT PORTLAND, or State Leaking Undergroundress: d Date: strict: / Comment: ALLISON AHOT PORTLAND, or	SAME AS ABOVE 26-99-0181 NWR REMEDIATION START DATE: 04 d Storage Tank / SRC# 440 SAME AS ABOVE 26-94-6001 27MAR1997 NWR REMEDIATION START DATE: 14	VISTA ID#: UNITA ID#: EPA/Agency ID: JAN1994REMEDIATION END VISTA ID#:	501035230 N/A DDATE: 13MAY1997		
Leak ID#: Region / Dis Description VISTA Address*: TATE LUST - S Agency Ad Leak ID#: Case Close Region / Dis Description VISTA Address*: TATE LUST - S	dress: strict: / Comment: MT. ST. JOSEPH AHOT PORTLAND, or State Leaking Undergroun dress: d Date: strict: / Comment: ALLISON AHOT PORTLAND, or State Leaking Undergroun	SAME AS ABOVE 26-99-0181 NWR REMEDIATION START DATE: 04 d Storage Tank / SRC# 440 SAME AS ABOVE 26-94-6001 27MAR1997 NWR	VISTA ID# EPA/Agency ID:	501035230 N/A DATE: 13MAY1997 501035218		
Leak ID#: Region / Dis Description VISTA Address*: TATE LUST - S Agency Ad Leak ID#: Case Close Region / Dis Description VISTA Address*:	dress: strict: / Comment: MT. ST. JOSEPH AHOT PORTLAND, or State Leaking Undergroun dress: d Date: strict: / Comment: ALLISON AHOT PORTLAND, or State Leaking Undergroun	SAME AS ABOVE 26-99-0181 NWR REMEDIATION START DATE: 04 d Storage Tank / SRC# 440 SAME AS ABOVE 26-94-6001 27MAR1997 NWR REMEDIATION START DATE: 14	VISTA ID#: UNITA ID#: EPA/Agency ID: JAN1994REMEDIATION END VISTA ID#:	501035230 N/A DATE: 13MAY1997 501035218		



* VISTA address includes enhanced city and ZIP.
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Report ID: 564801901

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	UNMAPPED SITES CO	NT.	
VISTA Address*:	SALMON HOT PORTLAND, or	VISTA ID#:	501035213
TATE LUST -	State Leaking Underground Storage Tank / SRC# 44	40 EPA/Agency ID:	N/A
Agency A			
Leak ID#:	26-94-5052		
Region / D	istrict: NWR		



* VISTA address includes enhanced city and ZIP.
For more information call VISTA Information Solutions, Inc. at 1 - 800 - 767 - 0403.
Report ID: 564801901

**VISTA address includes enhanced city and ZIP.

**Date of Report: April 19, 2000

**Page #17

SITE ASSESSMENT REPORT

DESCRIPTION OF DATABASES SEARCHED

A) DATABASES SEARCHED TO 1 MILE

NPL SRC#: 19

VISTA conducts a database search to identify all sites within 1 mile of your property. The agency release date for NPL was January, 2000.

The National Priorities List (NPL) is the EPA's database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund program. A site must meet or surpass a predetermined hazard ranking system score, be chosen as a state's top priority site, or meet three specific criteria set jointly by the US Dept of Health and Human Services and the US EPA in order to become an NPL site.

CORRACTS SRC#: 14

VISTA conducts a database search to identify all sites within 1 mile of your property. The agency release date for HWDMS/RCRIS was December, 1999.

The EPA maintains this database of RCRA facilities which are undergoing "corrective action". A "corrective action order" is issued pursuant to RCRA Section 3008 (h) when there has been a release of hazardous waste or constituents into the environment from a RCRA facility. Corrective actions may be required beyond the facility's boundary and can be required regardless of when the release occurred, even if it predates RCRA.

RCRA-Tsd Corracts SRC#: 556

VISTA conducts a database search to identify all sites within 1 mile of your property. The agency release date for HWDMS/RCRIS was December, 1999.

The EPA's Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation by the EPA of facilities which report generation, storage, transportation, treatment or disposal of hazardous waste.

B) DATABASES SEARCHED TO 1/2 MILE

CERCLIS SRC#: 17

VISTA conducts a database search to identify all sites within 1/2 mile of your property. The agency release date for CERCLIS was October, 1999.

The CERCLIS List contains sites which are either proposed to or on the National Priorities List(NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL. The information on each site includes a history of all pre-remedial, remedial, removal and community relations activities or events at the site, financial funding information for the events, and unrestricted enforcement activities.



NFRAP SRC#: 18 VISTA conducts a database search to identify all sites within 1/2 mile of your property.

The agency release date for CERCLIS-NFRAP was October, 1999.

NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly, or the contamination was not serious enough to require Federal Superfund action or NPL consideration.

SCL SRC#: 436 VISTA conducts a database search to identify all sites within 1/2 mile of your property. The agency release date for Voluntary Cleanup List was July, 1997.

This database is provided by the Department of Environmental Quality. The agency may be contacted at: 503-229-6361.

SCL SRC#: 438 VISTA conducts a database search to identify all sites within 1/2 mile of your property. The agency release date for Environmental Cleanup Site Information System was January, 2000.

This database is provided by the Department of Environmental Quality. The agency may be contacted at: 503-229-5619.

The Oregon Site Assessment Database Report includes sites where there has been a confirmed release of a hazardous substance; sites where there has been a confirmed release and investigation or cleanup has been initiated or completed; and sites where the Department has received information indicating that there may have been a release of hazardous substances.

SCL SRC#: 439 VISTA conducts a database search to identify all sites within 1/2 mile of your property. The agency release date for Summary of Facilities on DEQ Confirmed Release List was October, 1999.

This database is provided by the Department of Environmental Quality, Site Assessment Program. The agency may be contacted at: 503-229-6832.

RCRA-TSD SRC#: 12 VISTA conducts a database search to identify all sites within 1/2 mile of your property. **The agency release date for HWDMS/RCRIS was December, 1999.**

The EPA's Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation by the EPA of facilities which report generation, storage, transportation, treatment or disposal of hazardous waste. RCRA TSDs are facilities which treat, store and/or dispose of hazardous waste.

SWLF SRC#: 437 VISTA conducts a database search to identify all sites within 1/2 mile of your property.

The agency release date for Closure Regular Solid Waste Disposal Sites was March, 1999.

This database is provided by the Department of Environmental Quality. The agency may be contacted at: 503-229-6299.

The Oregon Closure Regular Solid Waste Disposal Sites list does not provide a facility street address, city, or zip code.



LUST SRC#: 440 VISTA conducts a database search to identify all sites within 1/2 mile of your property. The agency release date for LUST Database List was January, 2000.

This database is provided by the Department of Environmental Quality. The agency may be contacted at: 503-229-6085.

C) DATABASES SEARCHED TO 1/4 MILE

UST's SRC#: 442 VISTA conducts a database search to identify all sites within 1/4 mile of your property. The agency release date for Underground Storage Tank Facilities List was November,

This database is provided by the Department of Environmental Quality, UST Compliance Section. The agency may be contacted at: 503-229-6085; Caution-Many states do not require registration of heating oil tanks, especially those used for residential purposes.

D) DATABASES SEARCHED TO 1/8 MILE

ERNS SRC#: 8 VISTA conducts a database search to identify all sites within 1/8 mile of your property. The agency release date for was August, 1999.

The Emergency Response Notification System (ERNS) is a national database containing records from October 1986 to the release date above and is used to collect information for reported releases of oil and hazardous substances. The database contains information from spill reports made to federal authorities including the EPA, the US Coast Guard, the National Response Center and the Department of Transportation. The ERNS hotline number is (202) 260-2342.

RCRA-LgGen SRC#: 16 VISTA conducts a database search to identify all sites within 1/8 mile of your property. The agency release date for HWDMS/RCRIS was December, 1999.

The EPA's Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation by the EPA of facilities which report generation, storage, transportation, treatment or disposal of hazardous waste. RCRA Large Generators are facilities which generate at least 1000 kg./month of non-acutely hazardous waste (or 1 kg./month of acutely hazardous waste).

RCRA-SmGen SRC#: 15

VISTA conducts a database search to identify all sites within 1/8 mile of your property. The agency release date for HWDMS/RCRIS was December, 1999.

The EPA's Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation by the EPA of facilities which report generation, storage, transportation, treatment or disposal of hazardous waste. RCRA Small and Very Small generators are facilities which generate less than 1000 kg./month of non-acutely hazardous waste.



SPILL SRC#: 441 VISTA conducts a database search to identify all sites within 1/8 mile of your property. The agency release date for Log of Incidents Reported to DEQ was January, 2000.

This database is provided by the Department of Environmental Quality Waste Management Cleanup. The agency may be contacted at: .

SPILL SRC#: 443 VISTA conducts a database seárch to identify all sites within 1/8 mile of your property. The agency release date for Incidents Report Hazardous Materials Spills was January, 2000.

This database is provided by the State Fire Marshall, Environmental Cleanup Division. The agency may be contacted at: 503-373-1540.

End of Report



APPENDIX C

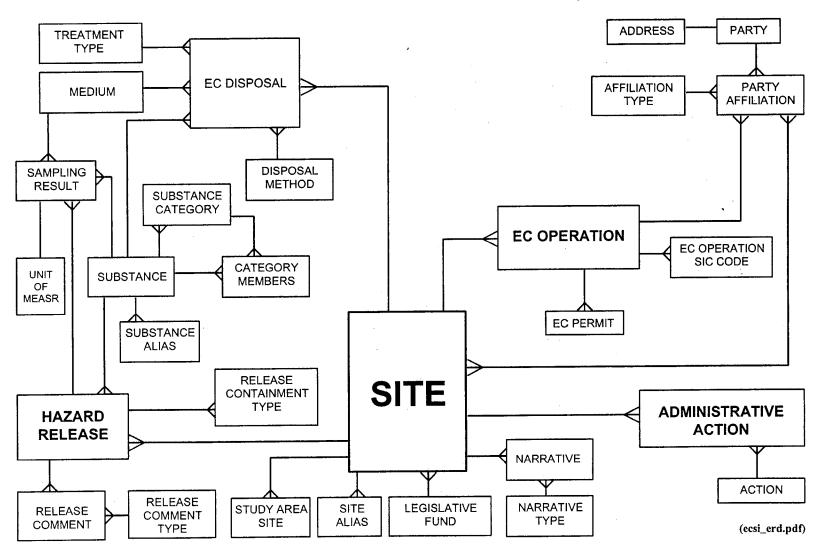
Online Information Sources - State UST Information, ECSI Database, Water Rights by Township, Water Rights Maps by Stream, Well Information.

lustlist3

		UST Cleanup List for Mult							
		This list was printed on : Mond	lay, December 13, 1999						
				715		CI EANUID	CLEANUD	END	SITE WORK
				ZIP			CLEANUP		
LOG NUMBER	LOCATION	SITE ADDRESS	CITY	CODE	REGION	LEAD	START	DATE	COMP DATE
26-89-0121	LINNTON PLYWOOD ASSOCIATION	10504 NW ST HELENS ROAD	PORTLAND	97231	NWR		24-Aug-89	04-Mar-91	05-Oct-90
26-89-0265	WEST COAST ADHESIVES CO.	11104 NW FRONT AVE	PORTLAND	97231	NWR	RP	15-Nov-89	07-Feb-92	06-Feb-92
26-90-0006	LINNTON PLANING MILL	11444 NW ST HELENS RD	PORTLAND	97231	NWR	RP	03-Jan-90		
26-90-0078	FRANKO #58	11130 NW ST HELENS	PORTLAND	97231	NWR		30-Nov-94	23-Jun-92	02-Apr-92
26-90-0283	MOBIL OIL CO.	9420 NW ST HELENS ROAD	PORTLAND	97231	NWR		07-Aug-90	1	
	ATLANTIC RICHFIELD/ARCO BULK PLANT	9930 NW ST HELENS ROAD	PORTLAND	97231	NWR	RP	28-Dec-92	29-Jul-93	29-Jul-93
26-94-0019	LINNTON PLYWOOD ASSOCIATION	10504 NW ST HELENS RD	PORTLAND	97231	NWR	RP	23-Feb-94		
26-94-0053	SAUVIE ISLAND SCHOOL DISTRICT #19	14445 NW CHARLETON RD	PORTLAND	97231	NWR		31-Mar-94		
	(b) (6)	(b) (6)	PORTLAND	97231	NWR			22-Aug-96	
26-94-5228	(b) (0)	(b) (0)	PORTLAND	97231	NWR			29-Sep-95	
26-95-0039			PORTLAND	97231	NWR		27-Feb-95	27-Oct-95	27-Oct-95
26-96-0026			PORTLAND	97231	NWR		22-Jan-96	13-Jan-97	28-Aug-96
26-96-0313			PORTLAND	97231	NWR		29-May-96		
26-96-0625			PORTLAND	97231	NWR		09-Oct-98		
26-97-0419			PORTLAND	97231	NWR			17-Mar-98	
	ROAD DISTRICT #1	10814 NW QUARRY RD	PORTLAND	97231	NWR		21-Oct-97		
	(b) (6)	(b) (6)	PORTLAND	97231	NWR		25-Jul-98	21-Sep-99	
26-99-0221	(8) (9)	(2) (3)	PORTLAND	97231	NWR			24-Mar-99	24-Mar-99
26-99-1209			PORTLAND	97231	NWR		22-Oct-99		

ENTITY RELATIONSHIP DIAGRAM

ENVIRONMENTAL CLEANUP SITE INFORMATION (ECSI) DATABASE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY





Sites Listed on Oregon's Environmental Cleanup Site Information Database (ECSI)

Multnomah County (zip 97218-97266)

as of December 29, 1999

Sites sorted by zip code, then site name

MULTNOMAH (zip 97218-97266)					
SITE NAME	SITE LOCATION	CITY	ZIP	ID	STATUS
AB Finishing Tech	6724 NE 46th AVE	Portland	97218	871	SRS Waiting List
Aircraft Service International, Taxiway F Area	Portland International Airport	Portland	97218	2240	Site Investigation recommended (SI)
Charles H. Lilly Co.	7737 NE Killingsworth ST	SRS Waiting List			
Columbia Woodworking Co.	6432 NE Columbia BLVD	Portland	97218	872	SITE PRIORITY EVALUATION FOR FURTHER ACTION
Femley Tire Fire	5411 NE Portland Hwy	Portland	97218	1181	NO FURTHER STATE ACTION REQUIRED
Flightcraft	7505 NE Airport WAY	Portland	97218	704	Other remedial or investigative action recommended
Groundwater - NE 55th AVE & Columbia BLVD	5611 NE Columbia BLVD	Portland	97218	1015	Other remedial or investigative action recommended
Harvey's Cleaners	5745 NE Prescott ST	Portland	97218	1518	SITE INVESTIGATION
Hertz Equipment Rental Facility	4939 NE Columbia BLVD	Portland	97218	1403	State Basic Preliminary Assessment recommended (PA)
Hoffman Construction Co.	8027 NE Killingsworth ST	Portland	97218	1522	NO FURTHER STATE ACTION REQUIRED
Killingsworth Fast Disposal Landfill (KFD)	NE 75th AVE & Killingsworth ST	Portland	97218	2251	REMEDIAL DESIGN
Miller Property	5421 NE Columbia BLVD	Portland	97218	1040	SITE PRIORITY EVALUATION FOR FURTHER ACTION
Nu-Way Oil Co.	7039 NE 46th AVE	Portland	97218	88	FEASIBILITY STUDY
Oregon Air National Guard Base	6801 NE Cornfoot RD	Portland	97218	1372	NEGOTIATIONS
Paramount Pest Control Inc.	5207 NE Portland Hwy	Portland	97218	1313	NO FURTHER STATE ACTION REQUIRED

Pierce Pacific Manufacturing	6540 NE 42nd AVE	Portland	97218	1092	Other remedial or investigative action recommended						
Tieree Tuerre Manufacturing		10000000	7,210								
Port of Portland - Light Rail Extension	Between I-205 at NE Clark Road and Portland International Airport	Portland	97218	2271	REMEDIAL INVESTIGATION						
Port of Portland - Terminal Expansion South	Portland International Airport	Portland	97218	2118	REMEDIAL INVESTIGATION						
Portland International Airport (PDX)	7000 NE Airport WAY	Portland	97218	273	VCS Waiting List						
Portland-Willamette Co.	6800 NE 59th PL	Portland	97218	976	NO FURTHER STATE ACTION REQUIRED						
Riedel - Meco Site	5601 NE Columbia BLVD	Portland	97218	1225	SITE PRIORITY EVALUATION FOR FURTHER ACTION						
Seastrom Property	6640 NE Portland Hwy	Portland	97218	1480	Site Confirmatory Sampling recommended						
Soil Contamination - NE Transport WAY	5700 NE Transport WAY	Portland	97218	1065	State Basic Preliminary Assessment recommended (PA)						
Sulzer Escher Wyss	6654 NE 47th AVE	Portland	97218	1503	NO FURTHER STATE ACTION REQUIRED						
The Halton Co.	4421 NE Columbia BLVD	Portland	97218	121	State Expanded Preliminary Assessment recommended (XPA)						
Classic Cleaners & Draperies	8602 SW Terwilliger BLVD	Portland	97219	1605	NO FURTHER STATE ACTION REQUIRED						
Fourier & Larson	10706 SW Capitol Hwy	Portland	97219	1411	NO FURTHER STATE ACTION REQUIRED						
Huntington Rubber Corp.	7030 SW Macadam AVE	Portland	97219	123	Other remedial or investigative action recommended						
ODOT - Baldock Maintenance Facility	9637 SW 35th DR	Portland	97219	1226	NO FURTHER STATE ACTION REQUIRED						
ODOT - Sylvan Maintenance Yard	2131 SW Scholls Ferry RD	Portland	97219	1837	FEASIBILITY STUDY						
Unocal Service Station #5958	8510 SW Terwilliger BLVD	Portland	97219	1069	Further Investigation of Area Facilities recommended						
Willamette Oaks Building	6720 SW Macadam AVE	Portland	97219	883	REMEDIAL INVESTIGATION						
Auto Salvage 205	5605 NE 105th Ave.	Portland	97220	2087	NO FURTHER STATE ACTION REQUIRED						
Cascade Station Development Area	South of Airport Way between I-205 and Portland Airport	Portland	97220	2390	Site Screening recommended (EV)						
DeWitt Construction	10910 NE Holman ST	Portland	97220	1350	NO FURTHER STATE ACTION REQUIRED						
Dollar Development Co.	10940 NE Holman ST	Portland	97220	1747	NEGOTIATIONS						
East Portland Maintenance Yard	5315 NE 101st AVE	Portland	97220	2061	Site Confirmatory Sampling recommended						
Gateway Porsche	NE 102nd AVE & NE Weidler ST	Portland	97220	1596	NO FURTHER STATE ACTION REQUIRED						
Holman Area Groundwater Contamination	Bounded by Sandy BLVD/I-205/Marine DR/NE 122nd	Portland	97220	1413	NEGOTIATIONS						
Holman Redevelopment Area - Parcel 236	11212 NE Holman St	Portland	97220	2097	NO FURTHER STATE ACTION REQUIRED						
Holman Redevelopment Area - Parcel 237	11300 block of NE Holman	Portland	97220	2098	NO FURTHER STATE ACTION REQUIRED						

Holman Redevelopment Area - Parcel 238	6154 NE 112th Ave	Portland	97220	2099	NO FURTHER STATE ACTION REQUIRED								
Holman Redevelopment Area - Parcel 240A	11309 NE Holman ST	Portland	97220	1507	SITE PRIORITY EVALUATION FOR FURTHER ACTION								
Holman Redevelopment Area - Parcel 245	11003 NE Holman ST	Portland	97220	1499	Site Confirmatory Sampling recommended								
Holman Redevelopment Area - Parcel 249	10835 NE Holman ST	Portland	97220	1506	NO FURTHER STATE ACTION REQUIRED								
Holman Redevelopment Area - Parcel 253	11037 NE Simpson ST	Portland	97220	1517	NO FURTHER STATE ACTION REQUIRED								
ICN Pharmaceuticals - Parcels 234A & 235	6060 NE 112th AVE	Portland	97220	1219	RECORD OF DECISION								
ICN/McClaskey Property	6154 NE 112th	Portland	97220	2039	NO FURTHER STATE ACTION REQUIRED								
James River Truck Fleet Terminal	5741 NE 92nd Drive	Portland	97220	1610	NO FURTHER STATE ACTION REQUIRED								
John James Property Inc.	NE 112th and NE Simpson St	Portland	97220	2036	NEGOTIATIONS								
Johnson Lake	W of I-205, E of NE 92nd ST	Portland	97220	2086	Further Investigation of Area Facilities recommended								
Marv Tonkin Leasing Co.	11858 NE Halsey ST	Portland	97220	1618	Long Term Care/Control recommended (OM)								
McClaskey Property/ICN	NE Holman Street at the intersection of NE 112th Ave	Portland	97220	2067	NO FURTHER STATE ACTION REQUIRED								
Myers Container Corp.	10103 NE Marx ST	Portland	97220	2062	Site Investigation recommended (SI)								
Oregon Fir Supply Co.	11100 NE Holman ST	Portland	97220	1220	REMEDIAL INVESTIGATION								
Oregon National Guard - PDX Airport #1	Southwest portion of airport	Portland	97220	637	SITE PRIORITY EVALUATION FOR FURTHER ACTION								
Owens Brockway Glass Container	5850 NE 92nd DR	Portland	97220	1311	SITE INVESTIGATION								
Pacific Power and Light - Villa Substation	N side of NE Multnomah Street and 133' E of NE 82nd Avenue	Portland	97220	2138	REMEDIAL INVESTIGATION								
Parkrose Auto Salvage	10415 NE Sandy BLVD	Portland	97220	1037	Site Screening recommended (EV)								
Port of Portland - Former Cadet Manufacturing	Approx. 6225 NE 105th Avenue (no actual site address)	Portland	97220	2215	REMEDIAL INVESTIGATION								
Taylor Property	SE Corner of NE Airport Way and NE Holman St	Portland	97220	2053	NO FURTHER STATE ACTION REQUIRED								
Tri-Met - Tunnel Construction Spoils	Intersection of I-205 and Columbia Blvd	Portland	97220	2304	NO FURTHER STATE ACTION REQUIRED								
United Medical Laboratory	11104 NE Holman ST	Portland	97220	1327	Site Screening recommended (EV)								
United Medical Laboratory/Drum Recovery	11104 NE Holman ST	Portland	97220	37	State Basic Preliminary Assessment recommended (PA)								
Verla Kwiram Property	11200 NE Simpson ST	Portland	97220	2127	NO FURTHER STATE ACTION REQUIRED								
Warehouse - NE 92nd AVE	1702 NE 92nd AVE	Portland	97220	1426	NO FURTHER STATE ACTION REQUIRED								

Sylvan Cleaners	1747 SW Skyline BLVD	Portland	97221	1897	RISK ASSESSMENT						
Fern AVE Ooze	6569 SE Fern AVE	Milwaukie	97222	1476	State Basic Preliminary Assessment recommended (PA)						
Unocal Service Station #5810	3046 SE Harrison ST	Milwaukie	97222	1504	NO FURTHER STATE ACTION REQUIRED						
Associated Chemists Inc.	4401 SE Johnson Creek BLVD	Portland	97222	94	NO FURTHER STATE ACTION REQUIRED						
Modern Plumbing Co.	9045 SW Burnham ST	Portland	97223	1435	NO FURTHER STATE ACTION REQUIRED						
Finlandia Sauna	14010 SW 72nd Ave.	Portland	97224	1914	SITE EVALUATION						
PGE - SW 68th AVE	5515 SW 68th AVE	Portland	97225	1137	Site Screening recommended (EV)						
Alder Creek Lumber Company, Inc.	14456 NW Gillihan Rd, Sauvie Island	Portland	97227	2446	Site Screening recommended (EV)						
Cascade Brake Products	698 N Page ST	Portland	97227	1019	State Basic Preliminary Assessment recommended (PA)						
Goldendale Aluminum Company	2600 N River St	Portland	97227	2440	State Expanded Preliminary Assessment recommended (XPA)						
Industrial Battery Building	3166 N Greeley AVE	Portland	97227	935	NO FURTHER STATE ACTION REQUIRED						
Louis Dreyfus Facility	N Holladay ST (Foot of)	Portland	97227	1394	Other remedial or investigative action recommended						
Mammal Survey & Control Service	216 N Tillamook ST	Portland	97227	1301	Site Screening recommended (EV)						
Master Chemical Inc.	642 N Tillamook ST	Portland	97227	1302	NO FURTHER STATE ACTION REQUIRED						
Nurnberg Scientific Co.	3237 N Williams AVE	Portland	97227	87	NO FURTHER STATE ACTION REQUIRED						
Priestley Oil & Chemical Co.	2429 N Borthwick AVE	Portland	97227	1139	State Basic Preliminary Assessment recommended (PA)						
RoMar Transportation Systems, Inc.	9333 N Time Oil Rd	Portland	97227	2437	State Basic Preliminary Assessment recommended (PA)						
Union Pacific RR - Albina Yard	2745 N Interstate AVE	Portland	97227	178	BASIC PRELIMINARY ASSESSEMENT						
Wagstaff Battery Manufacturing Co.	2124 N Williams AVE	Portland	97227	1243	Partial No Further Action						
Williamson & Bleid	1835 N Flint AVE	Portland	97227	776	Site Screening recommended (EV)						
Maniatis Property	12440 NW Laidlaw Rd	Portland	97229	2276	State Expanded Preliminary Assessment recommended (XPA)						
Boeing of Portland	19000 NE Sandy BLVD	Portland	97230	13	REMEDIAL ACTION						
Boyd Coffee	19730 NE Sandy BLVD	Portland	97230	967	NO FURTHER STATE ACTION REQUIRED						
Bridgestone/Firestone Pro-Tread Facility	18120 NE Wilkes RD	Portland	97230	1565	Independent Cleanup Program						
Elder Equipment Facility	13817 NE Sandy BLVD	Portland	97230	1408	State Expanded Preliminary Assessment recommended (XPA)						
Helfrich Property	251 NE 133rd AVE	Portland	97230	122	Remedial Investigation/Feasibility Study recommended						

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Hickory Springs Manufacturing Co.	3900 NE 158th AVE	Portland	97230	984	NO FURTHER STATE ACTION REQUIRED
Landa	12302 NE Marx ST	Portland	97230	131	NO FURTHER STATE ACTION REQUIRED
Libby, McNeil & Libby	19029 NE San Rafael ST	Portland	97230	1259	NO FURTHER STATE ACTION REQUIRED
NE 148th Ave. TCE Contamination	NE 148th AVE	Portland	97230	2242	Site Screening recommended (EV)
NE 158th Ave. TCE Contamination	NE 158th AVE	Portland	97230	2391	Further Investigation of Area Facilities recommended
Nick Spada Farm	Along NE 185th Ave. south of Marine Dr.	Portland	97230	1058	Site Confirmatory Sampling recommended
Norris Metal Polishing	4415 NE 148th AVE	Portland	97230	1490	NO FURTHER STATE ACTION REQUIRED
Northwest Retreaders, Inc.	19004 NE San Rafael ST	Portland	97230	1268	SITE PRIORITY EVALUATION FOR FURTHER ACTION
Opti-Craft	17311 NE Halsey ST	Portland	97230	1186	NO FURTHER STATE ACTION REQUIRED
Oregon Wire Products	13030 NE Whitaker WAY	Portland	97230	1029	NO FURTHER STATE ACTION REQUIRED
Rich & Rhine Inc.	13720 NE Whitaker WAY	Portland	97230	1867	Site Confirmatory Sampling recommended
RR Donnelley Norwest Inc.	17401 NE Halsey ST	Portland	97230	962	EXPANDED PRELIMINARY ASSESSMENT
Swift Adhesives	18408 NE San Rafael ST	Portland	97230	884	REMEDIAL ACTION
Texaco Service Station - NE Sandy BLVD	16531 NE Sandy BLVD	Portland	97230	992	NO FURTHER STATE ACTION REQUIRED
TRANSCO Industries Inc.	5530 NE 122nd AVE	Portland	97230	803	NO FURTHER STATE ACTION REQUIRED
UniFirst Corp.	14321 NE Sandy BLVD	Portland	97230	1692	SITE PRIORITY EVALUATION FOR FURTHER ACTION
Viking Industries Inc.	18600 NE Wilkes RD	Portland	97230	885	Refer to LUST Program
Wagner Mining & Construction Equipment Co.	4424 NE 158th AVE	Portland	97230	331	SRS Waiting List
Whitaker Building	12545 NE Whitaker Way	Portland	97230	2159	NO FURTHER STATE ACTION REQUIRED
ARCO Bulk Terminal	9930 NW St. Helens RD	Burlington	97231	1528	Remedial Investigation/Feasibility Study recommende
Linnton Oil Fire Training Grounds	NW Marina WAY	Burlington	97231	1189	REMEDIAL ACTION
St. Helens RD - Gasoline Spill	Hwy 30, east of Cornelius Pass RD	Burlington	97231	337	Site Screening recommended (EV)
ACF Industries	12160 NW St. Helens RD	Portland	97231	. 794	Remedial Investigation recommended (RI).
Babcock Land Company	9933 NW 107th Ave	Portland	97231	2361	State Basic Preliminary Assessment recommended (Pa
Columbia River Sand & Gravel Inc.	10504 NW Saint Helens Rd	Portland	97231	2351	Site Screening recommended (EV)

Foss Maritime/Brix Maritime	9030 NW Saint Helens Rd	Portland	97231	2364	State Expanded Preliminary Assessment recommended (XPA)				
GATX St. Helens RD Facility	11400 NW St. Helens RD	Portland	97231	1096	Remedial Investigation/Feasibility Study recommended				
Georgia-Pacific - Linnton Fiber Terminal	12222 NW Marina Road	Portland	97231	2370	BASIC PRELIMINARY ASSESSEMENT				
Hendren Tow Boats	8444 NW St. Helens Rd.	Portland	97231	2389	Site Screening recommended (EV)				
Linnton Plywood Association	10504 NW Saint Helens Rd	Remedial Investigation recommended (RI)							
Marine Finance Corp	8444 NW Saint Helens Rd	Portland	97231	2352	State Expanded Preliminary Assessment recommended (XPA)				
Mobil Oil Terminal	9420 NW St. Helens RD	Portland	97231	137	REMEDIAL DESIGN				
Olympic Pipe Line Company	11400 NW Saint Helens Rd (from RM 3.5 to RM 7.9)	Portland	97231	2374	Site Screening recommended (EV)				
Owens Corning - Linnton	11444 NW Saint Helens Rd	Portland	97231	1036	BASIC PRELIMINARY ASSESSEMENT				
Portland General Electric - Harborton Substation	12430 NW Marina Way	Portland	97231	2353	Remedial Investigation recommended (RI)				
RK Storage and Warehousing	10225 NW Front Ave	Portland	97231	2376	State Basic Preliminary Assessment recommended (PA)				
Transloader International Company	8444 NW Saint Helens Rd	Portland	97231	2367	SITE EVALUATION				
West Coast Adhesive Co.	11104 NW Front AVE	Portland	97231	333	Remedial Action recommended (RA)				
Blue Sky Filters	2833 NE Sandy Boulevard	Portland	97232	2054	Site Confirmatory Sampling recommended				
Carson Oil - SE 8th AVE	1208 SE 8th AVE	Portland	97232	367	NO FURTHER STATE ACTION REQUIRED				
Fred Meyer - Hyster	2902 NE Clackamas ST	Portland	97232	960	Other remedial or investigative action recommended				
Jiffy Lube Store #1011	2025 NE Broadway ST	Portland	97232	1570	State Basic Preliminary Assessment recommended (PA)				
Rose City Plating I	700 NE 3rd AVE	Portland	97232	278	NO FURTHER STATE ACTION REQUIRED				
Throwaway Bit Corp.	624 NE Everett ST	Portland	97232	1068	NO FURTHER STATE ACTION REQUIRED				
Timberline Dodge - 2500 NE Sandy	2500 NE Sandy Blvd	Portland	97232	2179	NEGOTIATIONS				
Timberline Dodge - 2520 NE Sandy	2520 NE Sandy Blvd	Portland	97232	2180	NEGOTIATIONS				
Timberline Dodge - Glisan	2640 NE Glisan St.	Portland	97232	2178	NEGOTIATIONS				
Your Town & Country Co-op	I-5 & I-84 Interchange	Portland	97232	334	Site Screening recommended (EV)				
Bill Yoder - Jeep Eagle	18449 & 18345 SE Stark ST	Portland	97233	1676	NO FURTHER STATE ACTION REQUIRED				
David Douglas Auto Shop	1500 SE 130th AVE Portland 97233 1674 Other remedial or investigative action record								
Rockwood Machine Shop (Former)	18917 E Burnside ST	Portland	97233	1142	Other remedial or investigative action recommended				

Griffin Brothers	1806 SE Holgate BLVD	Portland	97242	1294	SITE EVALUATION
Transmission Supply Co.	10709 SE Knight ST	Happy Valley	97266	1574	Removal Action Recommended (RM)
Ace Sanitary Service	6121 SE 91st AVE	Portland	97266	1270	NO FURTHER STATE ACTION REQUIRED
Apollo Metal Finishing, Inc Site 2	9335 SE Knapp ST	Portland	97266	2233	Independent Cleanup Program
C & R Welding - Dept. C	7807 SE 82nd AVE	Portland	97266	688	NO FURTHER STATE ACTION REQUIRED
Dobyns & Hart Pest Control - Portland	3303 SE 122nd AVE	Portland	97266	256	SITE PRIORITY EVALUATION FOR FURTHER ACTION
EW Shields	SE 92nd AVE & Flavel ST	Portland	97266	1163	Site Screening recommended (EV)
H2O Boat Barn	9001 SE Powell BLVD	Portland	97266	1502	Remedial Action recommended (RA)
(b) (6) Residence	(b) (6)	Portland	97266	1602	Site Confirmatory Sampling recommended
Jiffy Lube #1003	8350 SE Division ST	Portland	97266	1477	NO FURTHER STATE ACTION REQUIRED
RGM Investments	5611 SE 86th AVE	Portland	97266	1416	NO FURTHER STATE ACTION REQUIRED
Smurfit Newsprint - Portland Mill	6637 SE 100th AVE	Portland	97266	275	NO FURTHER STATE ACTION REQUIRED
Standard Battery	8215 SE Brooklyn ST	Portland	97266	777	Site Screening recommended (EV)
Unocal Service Station #4615	11824 SE Division ST	Portland	97266	1421	NO FURTHER STATE ACTION REQUIRED
(b) (6) _{Residence}	(b) (6)	Portland	97266	1601	Site Confirmatory Sampling recommended
Town & Country Chevrolet	16700 SE McLoughlin Blvd	Milwaukie	97267	2443	VCS Waiting List

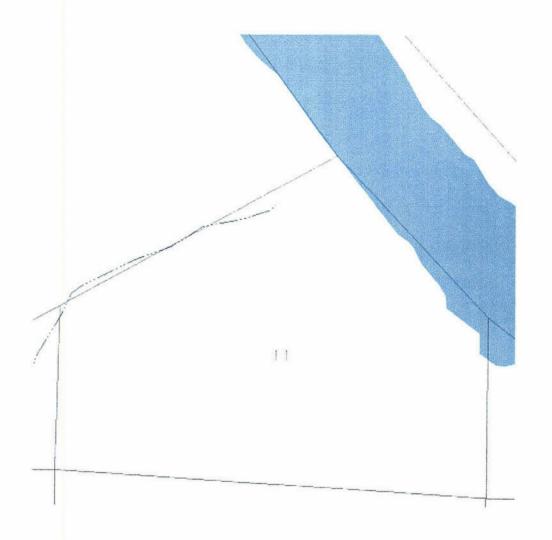
For more information, contacts are listed on ECSI main page.

Return to Cleanup and Spills Page Return to DEQ Home Page



This page updated: January 12, 2000

WATER RIGHTS IN TOWNSHIP 1 N 1 W Section(s) 11



PLACE OF USE BY SOURCE OF RIGHT Multiple shades indicates multiple sources for rights servicing the parcel. Bold number in parcel is referenced in report. POINT OF DIVERSION BY SOURCE OF RIGHT Number next to point is referenced in report.

- Serviced by surface water or decree right
- Reservoir right
- Serviced by Groundwater right
- Serviced by Groundwater registration right
- Surface water right point of diversion
- ♣ Groundwater right point of diversion
- Ground water registration point of diversion

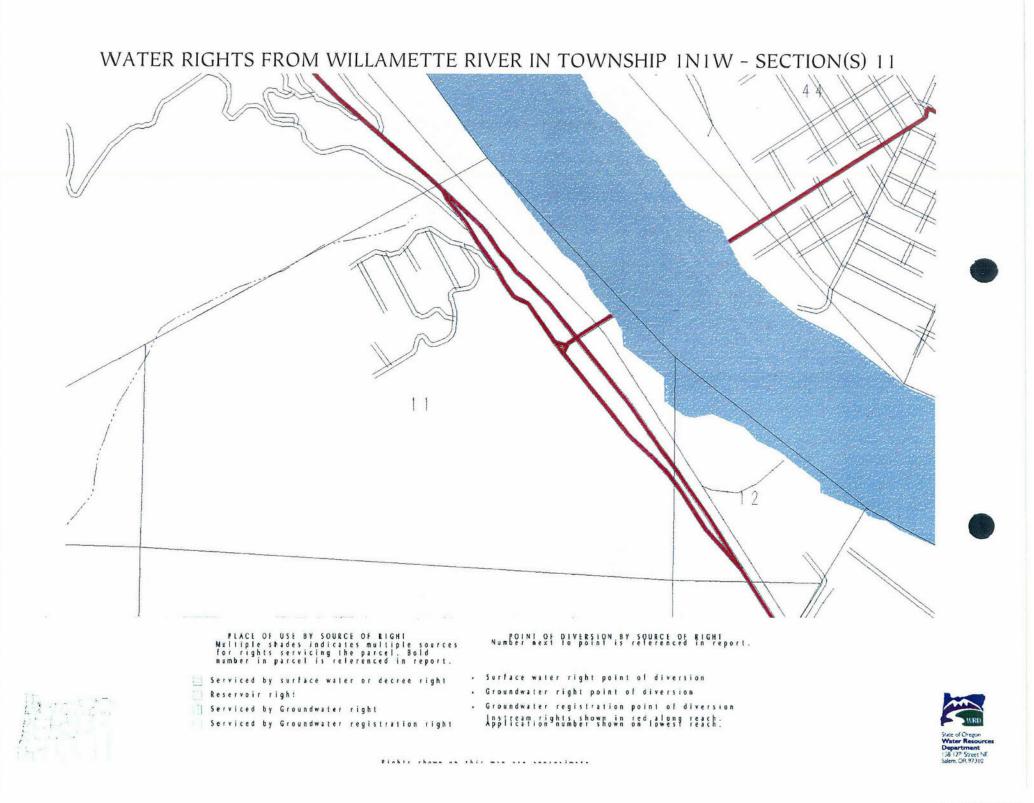
Instream rights shown in red along reach. Application number shown on lowest reach.



Rights shown on this map are approximate. Contact OW&D for the best locational data.



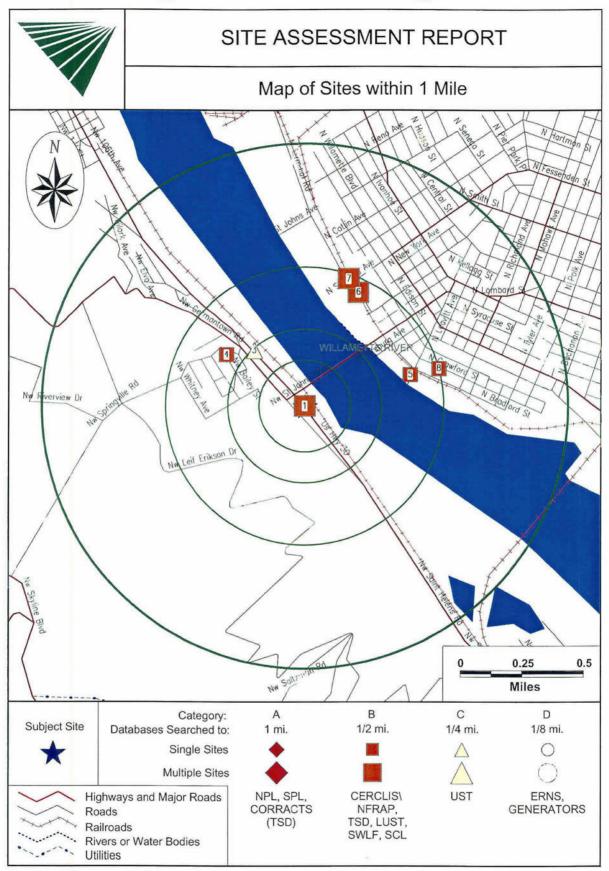
Map produced June 20, 2000

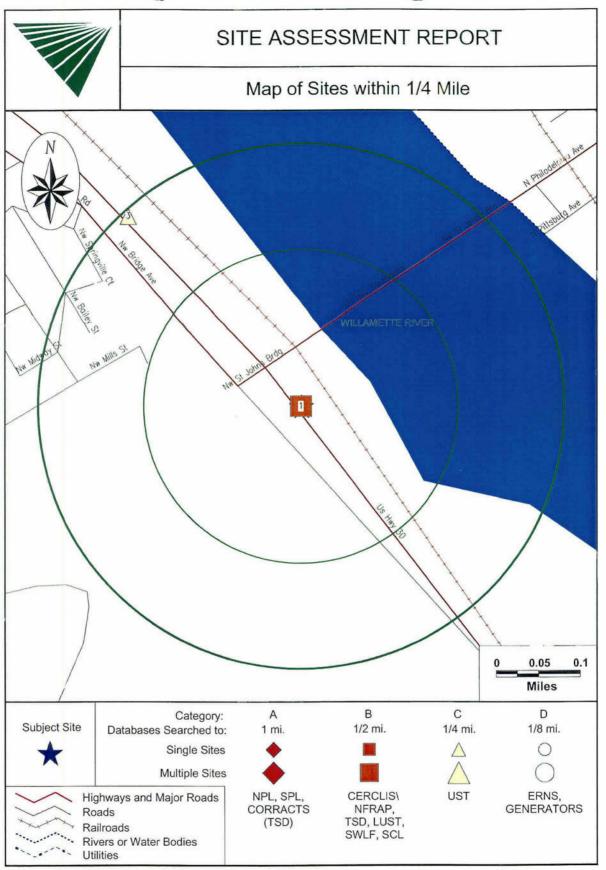


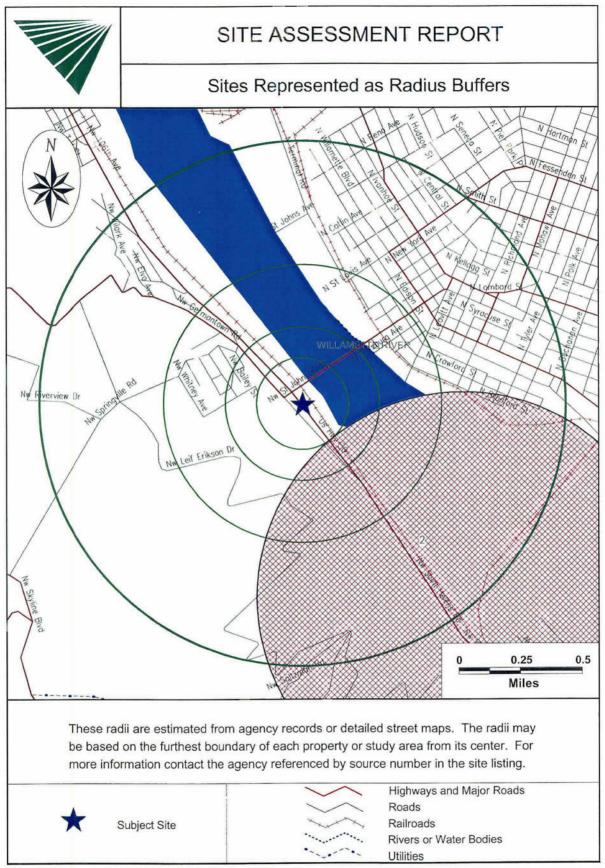
						Γ	Γ								7	or	str Ty		tior	ī		٧	Nel	I U	se	
Well Log	T-R-S/ Q-QQ	Taxlot	Street of Well	Owner	Company	Well Type	First Water	Completed Depth	Static Water Level	Yield	Completed Date	Bonded Constructor	Startcard	₩ PI II•M	New	Abandon	Deepen	Recond.	Repair	Conversion	Domestic	Irrigation	Community	Livestock	Infection	Thermal
MULT 47	(b) (6)			(b) (6)	(b) (6)	w	520	530	450	17	9/12/1990	FEAKIN, DON TURNER DRILLING CO	16068		х			-			х					
MULT 3671	IN-IW- II SE-NE		9100 NW ST HELENS RD, PORTLAND		TIME OIL CO.	М	18	35	18		8/4/1993	CRISMAN, RANDY L	55823		x											
MULT 4465	IN-IW- II NW-SE				MOBIL TERMINAL	М	0	0	0 .		11/17/1994	NIERMEYER, MICHAEL	73551			x										
MULT 5001	IN-IW- II SE-NW				WACKER STHRONIX CORP	w	0	0	0		9/1/1995	MCINNIS, GREG	81130			x										
MULT 5118	IN-IW- II NE-NW				MOBIL OIL	м	22	25	22		9/24/1987	MCINNIS, GREG			х											
MULT 5119	IN-IW- 11 NE-NW				MOBIL OIL	М	22	25	22		9/24/1987	MCINNIS, GREG			x											
MULT 5120	IN-IW- II NE-NW				MOBIL OIL	м	22	25	22		9/24/1987	MCINNIS, GREG			х											
MULT 53546	1N-1W- 11 NE-SW	1100	9100 NW ST HELENS RD, PORTLAND		TIME OIL CO.; TERMINAL ANNEX	м	20	30	20		4/3/1997	NIERMEYER, MICHAEL BRUCE CASCADE DRILLING INC.	95783	11672	х											
MULT 53658	1N-1W- 11 SW- NW	38			TIME OIL CO.	м		20	13.6		8/5/1993	DAY, JOHN M ALISTO ENGINEERING GROUP	80319							x						
MULT 53659	1N-1W- 11 SW- NW	38			TIME OIL CO.	м		20	16.1		8/4/1993	DAY, JOHN M ALISTO ENGINEERING GROUP	80318							x						
MULT 53660	1N-1W- 11 SW- NW	38			TIME OIL CO.	М		20	16.7		8/4/1993	DAY, JOHN M ALISTO ENGINEERING GROUP	80312							x						
MULT 53721	(b) (6)	(b) (6)	b) (6)	(b) (6)		w	320	425	182	38	6/9/1997	JANNSEN, PRESTON A A M JANNSEN DRILLING	99607	12923	х						х					
MULT 54409	1N-1W- 11 NW-NE	1200	9420 NW ST HELENS RD		MOBIL OIL TERMINAL	G		0			9/12/1997	·			x	x										
MULT 54410	IN-IW- II NW-NE	1200	9420 NW ST HELENS RD		MOBIL OIL TERMINAL	G		0			9/12/1997					x	-									
MULT 54411	IN-IW- 11 NW-NE	1200	9420 NW ST HELENS RD		MOBIL OIL TERMINAL	G		0			9/12/1997				x	х										

MULT	IN-IW-		9420 NW ST	MOBIL OIL						0/12/1907							7	7	\Box		7		
54412	NW-NE	1200	HELENS RD	TERMINAL	G	Ц	0		Ц	9/12/1997				Ľ	_	_	_ _	<u>Ļ</u>	Щ	Щ	_ _	<u> </u>	Ц
MULT 55885	11 NE-SE	1200	9420 NW ST HELENS RD	MOBIL OIL TERMINAL	G		26	10		6/8/1998				x									
MULT 55886	IN-IW- II NE-SE	1200	9420 NW ST HELENS RD	MOBIL OIL TERMINAL	G		25	10		6/8/1998				x									
MULT 56644	IN-1W- 11 SW-NE		NEAR NW SPRINGVILLE AND WHITNEY	CITY OF PORTLAND; BUREAU OF WATER WORKS	М	18	20	18		9/25/1998	MCINNIS, GREG GEO TECH EXPLORATIONS INC.	112577	29840	x									
MULT 56645	1N-1W- 11 SW-NE		NEAR NW SPRINGVILLE AND WHITNEY	CITY OF PORTLAND; BUREAU OF WATER WORKS	G		75	18		9/25/1998				x									
MULT 57595	IN-IW- II NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORPORATION	G		15	10		3/3/1999				x									
MULT 57596	IN-IW- II NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORPORATION	G		15	10		3/2/1999				x									
MULT 57597	IN-IW- II NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORPORATION	G		15	10		3/2/1999				x									
MULT 57598	IN-IW- 11 NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORPORATION	G		15	10	\bigcap	3/2/1999				x									
MULT 57599	IN-IW- II NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORPORATION	G			10		3/2/1999				х									
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MULT 57602	1N-1W- 11 NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORPORATION	G		14	13		2/23/1999				x									
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MULT 57607	IN-IW- II NE-SE	-	9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORPORATION	G		26	12		3/1/1999				x									
MULT 57608	IN-IW- II NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORPORATION	G		15	12		3/1/1999				х									

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MULT 57889	IN-IW- II NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORP.	G	14	13	4/8/1999				х					
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MULT 57895	IN-IW- 11 NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBILE OIL CORP.	G	22	12	4/6/1999				х					
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MULT 57898	IN-IW- 11 NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBILE OIL CORP.	G	23	13					х					
MULT 57899	IN-IW- 11 NE-SE		9420 NW ST HELENS RD, PORTLAND	MOBILE OIL CORP.	G	16	12	4/5/1999				x					
MULT 58283	IN-IW- II NE-SE	1300	9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORP.	М	11		6/22/1999	NIERMEYER, MICHAEL BRUCE CASCADE DRILLING INC.	122036	29223	х					
MULT 58284	IN-IW- II NE-SE	1300	9420 NW ST HELENS RD, PORTLAND	MOBIL OIL CORP.	М	24		6/22/1999	NIERMEYER, MICHAEL BRUCE CASCADE DRILLING INC.	122035	29222	x					
6030E	IN-IW- 11 NE-NW		9420 NW ST HELENS RD	OLYMPIC PIPE LINE CO	G	 15	4	2/15/2000				x					
50306	IN-IW- II NE-NW		9420 NW ST HELENS RD	OLYMPIC PIPE LINE CO	G	15	4	2/15/2000				x					
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MULT 60308	IN-IW- 11 NE-NW		9420 NW ST HELENS RD	OLYMPIC PIPE LINE CO	G	18	9.5	2/15/2000				x					
MULT 60309	IN-IW- 11 NE-NW		9420 NW ST HELENS RD	OLYMPIC PIPE LINE CO	G	15	4	2/15/2000				x					



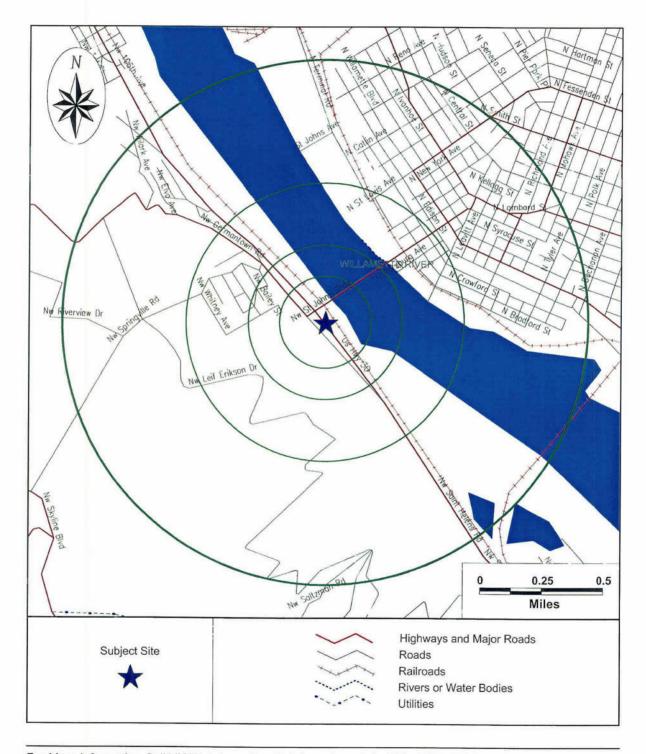






SITE ASSESSMENT REPORT

Street Map



APPENDIX D Health and Safety Plan

1.0 INTRODUCTION

This Health and Safety Plan (HSP) has been written for use by Jacobs Engineering Group Inc. (Jacobs) personnel and any other individuals with authorized access to areas where site control is established to conduct fieldwork. It may also be used as a guidance document by properly trained and experienced personnel; however, Jacobs does not guarantee the health and safety of any person entering this site. Because of the nature of this site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury on the site. The health and safety guidelines in this plan were prepared specifically for this site and should not be used on any other site without prior research by trained health and safety professionals. Should site conditions or the scope of work change from that described herein, the project manager should confirm with the Project Health and Safety Manager whether a modification to this HSP is necessary to protect worker's health and safety.

This HSP presents requirements and guidelines for expanded preliminary assessment (XPA) work on the Marine Finance site, which is being performed for the Oregon Department of Environmental Quality. It is in compliance with applicable sections of 29 Code of Federal Regulations (CFR) 1910.120 and 1926.65, Hazardous Waste Operations and Emergency Response.

This HSP is structured such that fundamental health and safety practices which apply to all environmental activities at the site regardless of task are described in the main text. Such practices include:

- the overall project health and safety organization, roles and responsibilities;
- · certain universal training requirements;
- sitewide hazard evaluation and controls;
- fundamental safe work practices including site controls;
- · personnel and air monitoring principles applicable to most work tasks; and
- emergency response procedures to be used throughout the site.

Jacobs corporate health and safety procedures are written to provide specific, detailed guidance on health and safety practices at worksites. Therefore where Jacobs CHSPs or the client's health & safety procedures apply, they are referenced rather than repeated herein. Each project HSP incorporates as applicable:

Federal, state, and local regulations;

- Corporate Health and Safety Procedures (CHSPs) contained in the Jacobs Corporate Health and Safety Procedures Manual (CHSPM). (These manuals shall be available at project sites);
- Procedures contained in the project Work Plan.

Occasionally, conflicts may arise in these different documents. The requirement most protective of worker health and safety, the public, and property shall take precedence.

Task-specific hazards and controls, as well as task-specific personnel assignments are described in the attached tables (Tables D1 - D10), which comprise the project-specific safe plan of action (SPA). The project-specific safe plan of action is a task driven control document designed to ensure that every task receives proper safety planning prior to beginning work. Individual projects will require that the forms presented in the SPA be completed, reviewed, and approved before specific field activities may proceed. Crew and subcontractor input should be solicited to identify hazards and hazard control measures to specify in the SPA.

Copies of this HSP will be maintained by the Site Health and Safety Officer (HSO) and the Project Health and Safety Manager (PHSM). Copies with the applicable SPA will be located with each field crew.

Health and safety are basic or inherent values of the work performed at Jacobs, and each employee is held accountable and responsible for working safely, including following the procedures and guidance of this HSP.

2.0 GENERAL PROJECT INFORMATION

This HSP is for work at the Marine Finance site. The facility layout and roads are shown on the General Map presented in Figure 2-1 of the XPA Work Plan. Discussion of the site, history, previous investigations, and proposed activities are included in the XPA Work Plan.

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3.0 FIELD OPERATIONS ADMINISTRATION

Safety is an essential part of line management function and responsibility. It is the responsibility of site management to see that each person on the project complies with all safety rules and requirements. To accomplish this overall responsibility, specific responsibilities have been established as follows.

This section identifies project organization and personnel responsibilities for the management and implementation of this HSP.

3.1 THE JACOBS ORGANIZATIONAL STRUCTURE

For specific project or task personnel assignments, refer to the project-specific SPA.

3.2 PERSONNEL RESPONSIBILITIES

CHSP 1.5, Health and Safety Program Implementation Responsibilities details health and safety roles and responsibilities. In some situations, for example on smaller projects, an individual may adopt several roles. Additionally, CHSP 1.5 requires employees to report unsafe conditions and correct the unsafe acts of their coworkers.

3.3 SUBCONTRACTORS

Subcontractors that work for Jacobs will implement and follow this plan and will have the following specific duties:

- attending site-specific orientation and follow the requirements set forth in this plan;
- signing a signoff sheet as shown in SPA, Table D-9 before working onsite, thereby agreeing to abide by this HSP, which will be retained by the HSO.
- providing copies to the HSO of Material Safety Data Sheets (MSDSs) for hazardous chemicals brought onsite;
- providing copies to the HSO of training and medical authorizations required to work onsite, including those required by 29 CFR 1910.120(e) and (f);
- developing safe work procedures for each separate phase of work. The procedures will address the specific hazards associated with the task to be performed for the particular phase of the work (i.e., locations of overhead utility lines, traffic patterns, etc.). Specific work procedures to mitigate the hazards will be developed and given to Jacobs for approval;

- ensuring that all employees are trained in the safe and proper use of all tools they may use;
- appointing an onsite Safety Representative;
- ensuring that all employees receive Jacobs Safety Orientation prior to starting work. Submit a report to the Jacobs HSO outlining the training received, the name and social security number of each individual, the date, and his/her signature;
- providing all necessary PPE to employees, and ensure its proper use;
- maintaining all necessary records and submit required reports;
- conducting weekly tool box safety meetings;
- obtaining all work permits as required;
- conducting safety inspections on a daily basis. Unsafe conditions are to be corrected promptly;
- conducting regularly scheduled inspections of equipment. Defective or unsafe equipment must be red tagged and taken out of service or repaired immediately;
- providing documentation of inspection and corrective actions to the HSO on a weekly basis.

Refer to the subcontract, and subcontractor's safety performance requirements for additional information.

The SM will inform the subcontractor's site manager or leader of any health and safety violations. Under imminent danger conditions, any worker may stop subcontractors work until the unsafe condition(s) is corrected. The SM may seek to terminate the contract for imminent danger conditions.

3.4 VISITORS

Visitors to the facility entering a controlled area on a Jacobs worksite are responsible for the following:

- providing copies to the HSO of all training certifications and medical authorizations required by 29 CFR 1910.120 (e) and (f);
- providing copies to the HSO of MSDSs for all hazardous chemicals brought onsite; and
- agreeing in writing to comply with all provisions of the site HSP.

Visitors must obtain clearance from the HSO before obtaining access to controlled areas. In most cases, visitor access will be limited to the support zone. Visitors will receive a job-specific safety briefing and will be escorted at all times. Visitors in areas requiring Level A, B, C, or D PPE must have the equivalent training and PPE as the onsite worker to gain entry. Jacobs is not responsible for distributing or obtaining PPE for visitors.

4.0 GENERAL HEALTH AND SAFETY REQUIREMENTS

This section discusses the health and safety training, briefings, and medical monitoring requirements for site personnel.

4.1 PERSONNEL TRAINING REQUIREMENTS

Site personnel involved in hazardous waste field activities are required to be trained in accordance with 29 CFR 1910.120(e). CHSP 3.2, Health and Safety Training-Hazardous Waste Operations details the following training requirements:

- Preassignment Training;
- First Aid, Bloodborne Pathogen and Cardiopulmonary Resuscitation;
- Three Day Supervised Field Experience;
- Supervisor Training for at least one onsite team member;
- Site-Specific Safety Orientation Meeting;
- Daily Task Meetings;
- Weekly Safety Meetings; and
- Equipment Operator Qualifications.

4.2 HAZARD COMMUNICATION PROGRAM

The Hazard Communication Program is established to inform employees and subcontractors of hazards that they may encounter.

4.2.1 Hazard Communication Training

The HSO will present Hazard Communication training in accordance with Jacobs CHSP 1.3, Hazard Communication Training, before starting work.

4.2.2 Warning Labels and Material Safety Data Sheets

In compliance with the CHSP 1.3, Hazard Communication, the HSO will ensure that chemical products are appropriately labeled and will obtain MSDSs for all such products. Employees may obtain copies of MSDSs from the HSO for chemical products used in the workplace.

4.2.3 Communication of Health and Safety Concerns

If health and safety concerns arise during field activities, the following steps should be taken:

- Bring health and safety concerns to the attention of the HSO, and/or SM.
- Bring health and safety concerns that the HSO and/or SM are unable to address satisfactorily to the attention of the PjM or PHSM.
- In the event of an incident or emergency, notify responsible personnel listed in Section 9.2.1.

4.3 EMPLOYEE MEDICAL SURVEILLANCE

Field personnel shall participate in a medical surveillance program. The specifics for the baseline, interim, and annual physicals can be found in the CHSP 4.1. Field employees, which includes all subcontractor field employees, must present to the HSO documentation of their participation in the medical program. Employees with medical limitations are responsible for notifying project managers and the PHSM to ensure that proper tasks are assigned. The PHSM may consult the OMC for further directions if exposure incidences occur and/or if additional medical tests are necessary (e.g., if the presence of pesticides onsite requires baseline cholinesterase levels).

Each employee is responsible for completing a monthly exposure form and for notifying management if an incident or exposure occurs. The Denver Health and Safety Office maintains monthly exposure forms for Jacobs employees.

Teaming partners and/or subcontractors shall provide the HSO with documentation of employees' participation in a medical surveillance program before their employees begin fieldwork. Documentation will be retained onsite.

The SPA identifies task-specific medical monitoring that is in addition to the medical surveillance for any hazardous waste worker. Medical surveillance is required for all respirator wearers and is not additionally specified here.

4.4 INSPECTIONS

Site and equipment inspections will be performed on a routine basis to verify applicability of, and compliance with this HSP. Project management and the safety department will perform Site Safety audits as specified in Section 3.2, Personnel Responsibilities.

4.4.1 Site Inspections

HSO: The HSO will make daily safety surveys of the project. Survey results and corrective actions will be maintained in the HSO logbook.

PHSM: The PHSM will conduct periodic audits of the project.

Supervisors: Supervisors on job sites shall conduct inspections of the jobsite prior to the start of work each day.

Site Manager: The Site Manager and HSO shall conduct a review of the jobsite prior to initiation of any new phase of work, and as a minimum once per week thereafter.

All site inspection results should be reviewed with the HSO, PHSM, SM and subcontractors (as applicable).

4.4.2 Equipment Inspections

The following equipment must be inspected as noted by a designated competent person and inspection reports kept on file in the HSO office.

Daily inspections shall be conducted by all user employees prior to the use of work tools and/or equipment, personal protective equipment, work platforms, and general work area.

Equipment	Inspection Frequency
Cranes	Weekly
Come-along/Chainfalls	Monthly
Drill Rigs	Weekly
Drum Hoist	Weekly
All Electrical Equipment & Cords	Monthly
Aerial Lifts	Monthly
Fire Protection Equipment	Monthly
Forklift Trucks	Daily
Welding Machines	Monthly
Hand Tools	Monthly

Inspections of excavations will be concluded at the beginning and end of shifts, at a minimum and to retain records of these inspections.

The safety surveys conducted by Jacobs personnel in no way relieves subcontractors of their duty to self inspect their work and equipment and to retain records of these inspections.

4.4.3 Safety Observation Reports

The Safety Observation Report (SOR) allows any site employee to record observed safety deficiencies and identify the cause so that corrective action can be taken. All employees should be trained and encouraged to turn completed SOR forms in to the Site Manager. Site Management is responsible for taking positive actions to eliminate identified safety deficiencies.

5.0 HAZARD EVALUATION AND CONTROL

The activities covered by this HSP present potential chemical, physical, and biological exposure hazards that may be encountered during the conduct of work. Chemical and physical hazards and controls are detailed in the SPA. Biological hazards are detailed here. A Project Hazard Analysis for each project and task is included in the SPA. The following CHSPs provide specific information on Hazard Evaluation and Control:

- CHSP 11.4 and 11.5, Heat Stress and Cold Stress, respectively \square
- CHSP 11.1, Biological Hazard Control M
- CHSP 7.3.3 Utility Clearance \square
- CHSP 7.3.6, Drum Handling \square
- CHSP 8.9, Drilling in VOC Contaminated Soils $\sqrt{}$
- CHSP 8.6, Materials Handling \mathbf{M}
- CHSP 11.8 Ergonomics V

CHSP 7.3.1, Site Health and Safety Plans, details the task hazard analysis process. This HSP covers a wide variety of hazards known or suspected to exist or that are inherent to the process of environmental investigation activities; however, unforeseen hazards may be present in the performance of some tasks. Hazards not covered by this HSP specifically will be assessed by the HSO and the PHSM for the appropriate control measures to maximize worker, environment, and public safety.

5.1 PHYSICAL HAZARDS

Specific physical hazards and controls associated with individual projects to be performed at this facility are described in the SPA, Project Hazard Analysis (Table D-3). Detailed Job Safety Analysis (JSA) for complex/unusual tasks such as operation of high pressure spray units, excavator operation, etc., will be included as an attachment if necessary. Where detailed CHSP exist for a task, a simplified JSA may be used.

Most tasks will be performed outdoors during daylight hours. For activities conducted indoors or after daylight hours, follow guidance for the proper illumination as required by 29 CFR 1910.120(m).

5.2 CHEMICAL HAZARDS

The SPA presents the Chemical Hazard Summary for each suspected contaminant along with OSHA, American Conference of Government Industrial Hygienists, and/or National Institute for Occupational Safety and Health (NIOSH) exposure limits for each contaminant. Also included are the target organs, routes of exposure, and acute and chronic overexposure symptoms. The SPA lists specific chemical hazards known or suspected at each project site.

The PHSM will evaluate any unforeseen chemical hazards encountered during the performance of tasks covered by this HSP.

5.3 BIOLOGICAL HAZARDS AND CONTROLS

CHSP 11.1 describes common biological hazards found in the U.S. Identification of specific biohazards which may be found at this project site include poisonous plants, including poison ivy and poison oak, and venomous spiders. Snapping turtles and venomous water snakes may be found in the Willamette River, but all sediment sampling will be performed from a boat.

5.4 RADIOLOGICAL HAZARDS AND CONTROLS

Not Applicable.

5.5 ENVIRONMENTAL HAZARDS

Hazards presented by the natural work environment may include heat or cold stress, and inclement weather.

5.5.1 Heat and Cold Stress

CHSPs 11.4 and 11.5, outline exposure control methods for working in extreme temperatures. Consult CHSPs 11.4 and 11.5 for details. Table 5-1 summarizes symptoms and treatment procedures for heat and cold stress.

TABLE 5-1 Symptoms and Treatment of Heat and Cold Stress

Condition	Symptoms	Treatment
Heat stroke	Red, hot, dry skin; no perspiration; dizziness; confusion; rapid breathing and pulse; high body temperature.	This is a MEDICAL EMERGENCY! Cool victim rapidly by soaking in cool (not cold) water. Loosen restrictive clothing. Get medical attention immediately!
Heat exhaustion	Pale, clammy, moist skin; shallow breathing; profuse sweating; weakness; normal temperature; headache; dizziness; vomiting.	Move victim to a cool, air- conditioned area. Loosen clothing, place head in low position. Have victim drink cool (not cold) water.
Frostbite	Blanched, white, waxy skin, but resilient tissue; tissue cold and pale.	Move victim to a warm area. Warm area quickly in warm (not hot) water. Do not break any blisters. Elevate the injured area and get medical attention.
Hypothermia	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.	Move victim to a warm area. Have victim drink warm fluids - not coffee or alcohol. Get medical attention.

5.5.2 Inclement Weather

In the event of adverse weather conditions, the HSO and SM will determine whether work can continue without compromising the health and safety of site personnel. The SM and HSO will direct the implementation of precautions necessary to ensure the health and safety of site personnel. The HSO and SM should comply with CHSP 14.3 Hurricane and Typhoon procedure when such weather conditions develop. Adverse weather may include the following:

- high winds:
- limited visibility:
- heavy rainfall or hail:
- tornadoes:
- potential for heat stress:

- · electrical storms: and
- potential for cold stress.

5.6 ERGONOMIC HAZARDS

Cumulative trauma disorders (CTDs) occur most frequently as a result of strain from performing the same task on a continuous basis. The primary risk factors for CTDs are as follows:

- repetitive motion;
- excessive force; and
- awkward position.

CHSP 11.8 describes ergonomic hazard identification and controls for both field work and in the office at a computer workstation. Ergonomic hazards associated with specific activities at this site are detailed in the SPA, Project Hazard Analysis (Table D-3).

Any employee exhibiting symptoms of CTDs, including a prickling or tingling sensation in the fingers or pain, loss of sensation, or weakness in a part of the body, should contact the HSO promptly.

5.7 CONFINED SPACE HAZARD

Not Applicable

6.0 SITE CONTROL

Site control will be implemented as described in CHSP 7.3.2, Site Control. Effective site control procedures will reduce the potential exposure of the project team, workers at the client's facility, members of the public, and the surrounding environment to the hazards onsite. Site control includes the following safe work practices:

- limiting site access to essential personnel;
- establishing work zones within the site, and documenting personnel entering exclusion zones;
- conducting operations in a manner to reduce the exposure of personnel and equipment and to eliminate the potential for offsite dispersion; and
- establishing decontamination procedures for personnel and equipment.

6.1 WORK ZONES

Clearly delineated work zones help ensure the following:

- Site personnel are adequately protected from existing hazards.
- Specific activities and hazards are confined to the appropriate areas.
- Personnel may be accurately and quickly located and evacuated during an emergency.
- Personnel will comply with CHSP 7.3.2, Site Control, in establishing and maintaining such zones.
- For work areas where the potential exists for exposure to radiological hazards, radiological areas (including inside an Exclusion Zone [EZ]) will be established and posted.

6.2 Buddy System

Personnel in contaminated or hazardous areas as determined by the HSO, will work with a buddy who is capable of the following:

- assisting his or her partner;
- monitoring the partner for signs of chemical or other exposures (e.g., heat or cold);
- periodically verifying the integrity of the partner's PPE; and
- notifying the HSO if emergency help is needed.

As personnel enter an EZ through the access control point, the HSO will verify that personnel will employ the buddy system at all times.

6.3 Communications

Verbal communication at the sites may be impaired by onsite background noise caused by heavy equipment and by the use of PPE. Hand signals to be used between personnel within an EZ will be reviewed during tailgate safety meetings conducted before starting work. Communication between personnel at the project site, will be conducted using two-way radios. Communication with personnel not located at the project site will be via telephones and digital pagers. Specific telephone and digital pager numbers for personnel assigned to individual projects are given in the SPA, Table D-2.

6.4 Security

Site security is essential to (1) prevent unauthorized, unprotected, or unqualified people from exposure to site hazards; (2) prevent vandalism; and (3) protect established and safe working procedures. Site security will be maintained in the following ways:

- limiting access at control points to authorized and essential personnel;
- assigning the responsibility for enforcing exit and entry requirements;
- giving the HSO the authority to approve all visitors to the site; and
- stopping work immediately if unauthorized personnel attempt to or succeed in accessing
 the work area or EZ. (In this case the employee will contact the HSO, SM, and PjM
 immediately.)

6.5 DECONTAMINATION PROCEDURES

Decontamination protects workers, the public, and the environment by limiting exposure to harmful substances and by preventing the spread of contamination. The HSO will oversee decontamination procedures to determine their effectiveness, and take corrective actions to rectify any deficiencies.

6.5.1 Personnel Decontamination

At areas where an EZ is necessary, all personnel exiting an EZ will follow decontamination procedures. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the EZ before decontamination. The HSO may approve simplification of the procedures in the field when a determination has been made that decontamination

procedures are unnecessary. Level A, B, and C decontamination will be performed in accordance with CHSP numbers 11.9.1, Level A Decontamination; 11.9.2, Level B Decontamination; and 11.9.3, Level C Decontamination. Level D and D-Modified decontamination will be done as described in CHSP 11.9.4.

6.5.2 Equipment and Vehicle Decontamination

Equipment will be decontaminated in accordance with site requirements as indicated in the XPA Work Plan.

6.6 WASTE HANDLING AND DISPOSAL

Waste generated onsite from field activities includes the investigation derived waste, PPE, laboratory waste, field trash, and office trash. Handling and disposal of IDW is discussed in the XPA Work Plan.

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7.0 PERSONNEL AND AIR MONITORING

Ambient air monitoring and personal sampling may be conducted during work under this HSP. Procedures for air monitoring and sampling are described in CHSP 12.1. The SPA, Table D-6, provides a list of monitoring methods, frequencies, and action levels for specific tasks covered by this HSP.

Monitoring results will be recorded on the Health and Safety Air Documentation. Monitoring form included as Attachment to CHSP 12.1. or on the appropriate form required by client procedures. In addition, each instrument's name, model, serial number, calibration data and site conditions will be recorded once before the first entry of monitoring results.

Personal exposure monitoring shall be documented and maintained in an employee's personnel file and in the site project files. Employees monitored shall receive a copy of the sampling results within 15 days of the testing.

7.4 INSTRUMENT CALIBRATIONS AND MAINTENANCE

Instrumentation used to monitor employees' nonradioactive exposures will be calibrated and maintained by the HSO as directed by the instrument manufacturer. The following guidelines will be used:

- 1. Instruments will be calibrated before and after use or maintenance in accordance with the manufacturer's instructions. Calibration data will be recorded in an instrumentation calibration logbook.
- 2. Calibration standards will be traceable to a National Institute of Standards and Technology primary standard or be a recognized primary standard. Copies of calibration standard certificates will be maintained at the project site.

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8.0 PERSONAL PROTECTIVE EQUIPMENT

The purpose of personal protective clothing and equipment is to shield or isolate individuals from the hazards that may be encountered when engineering and other controls are not feasible or cannot provide adequate protection. Adherence to all prescribed controls is vital to minimize exposures. Engineering and administrative controls are specified in the SPA.

General PPE ensembles for site activities are defined by the EPA and OSHA. The SPA summarizes the specific PPE ensembles that are required for this project by work task. PPE levels may be upgraded or downgraded based on conditions specified in Sections 8.2 and 8.3. PPE, including respiratory protection equipment, will be inspected, tested, and used as required in Jacobs' CHSPs. The HSO or designee will train personnel on the use and limitations of all PPE issued.

The HSO will authorize modifications and announce changes and the justification for those changes at a site safety meeting. These changes to PPE requirements will be coordinated with the Jacobs PHSM.

Section 8 addresses the levels of protection, and the process for upgrading and downgrading levels of protection.

8.1 Levels Of Protection

The specific level of PPE used onsite will be determined based on site conditions.

The following CHSPs provide specific information on Jacobs Personal Protective Equipment Program:

- CHSP 13.2, PPE Program for Environmental Activities;
- CHSP 13.9, Respiratory Protection Program.

CHSP 13.0, Personal Protective Program includes procedures for eye, head, hearing, hand and foot protection; as well as hair and clothing policies and fall protection policies.

8.2 Upgrading Levels Of Protection

Levels of protection will be upgraded or downgraded in response to site conditions. Table 8-1 summarizes conditions that might require an upgrade or that may indicate that a downgrade is possible.

The HSO will inform the PHSM of PPE downgraded or upgraded from initial requirement of the SPA, Table D-7. The field team will be notified of PPE changes in a tailgate safety meeting.

. TABLE 8-1 Reasons to Upgrade or Downgrade Level of Protection

Request of individual performing task with	New information indicating that situation
concurrence from HSO.	is less hazardous than originally
Change in work task that will increase	thought.
contact or potential contact with hazardous materials.	Change in site conditions that decreases the hazard.
 Action levels described in Appendix A exceeded. 	Change in work task that will reduce contact with hazardous materials.
New information indicating that situation is more hazardous than originally thought.	

9.0 EMERGENCY RESPONSE/CONTINGENCY PLAN

The following sections describe pre-emergency planning, emergency equipment and supplies, emergency procedures, emergency response and accident follow-up, evacuation information, contacts, postincident notifications, record keeping, and vehicle accident procedures. The following CHSP's provide specific information on Emergency Response:

- CHSP 7.3.7, Emergency Planning and Response
- CHSP 5.0, Accident and Incident Reporting and Recordkeeping
- CHSP 14.1, Emergency Evacuation Procedure
- CHSP 14.4, Remote Site Emergency Preparedness

9.1 EMERGENCY PROCEDURES

These sections describe procedures for performing emergency planning, providing emergency equipment and supplies, handling emergency medical treatment, and providing for fire protection and for PPE and other equipment failure. The SPA, Table D-3, includes emergency prevention and recognition for specific tasks.

9.1.1 Pre-Emergency Planning

The HSO in coordination with the SM performs the applicable emergency planning tasks before starting field activities and coordinates emergency response with the facility and local emergency service providers as appropriate. CHSP 7.3.7 provides a pre-emergency planning list for the SM and HSO.

9.1.2 Emergency Communication

In addition to communication methods described in Chapter 6.3 of this HSP the following communication methods will be used.

The following visual hand signals will be used:

- clutching throat: personal distress; and
- arm waving or pointing in exit direction: evacuate.

When calling for an emergency response, by telephone or radio, report the following information:

name and association;

- location;
- type of emergency;
- time of incident; and
- type of first aid or response rendered.

The caller should not hang up until the emergency responder has received complete emergency response information.

A complete notification procedure is provided in CHSP 5.1.3 Reports and Recordkeeping.

9.1.3 Emergency Equipment and Supplies

CHSP 7.3.7 specifies basic first aid and emergency response supplies.

9.1.4 Emergency Medical Treatment

If a medical emergency occurs, the HSO or SM assumes charge until an ambulance arrives, or until the injured person is admitted to the emergency room. CHSP 7.3.7 provides guidance on emergency medical care and treatment.

Site personnel will prevent further injury by taking the actions listed below:

u	information on exposure to bloodborne pathogens.	
	Call ambulance and hospital as appropriate.	
	Determine whether decontamination will make injury worse. If yes, seek medical treatment immediately.	
	Make certain the injured person is accompanied to the emergency room by at least one field team member with the same employer.	
	An Authorization for Medical Treatment Form shall be taken with the injure employee to the medical facility. The top portion of the form is completed by the HSO or SM, and the bottom portion is completed by the doctor at the medical facility.	

9.1.5 Transport to Medical Facility

An ambulance should be used to transport a seriously injured worker to the medical facility in order to ensure medical care enroute.

Figure 2-1 of the XPA Work Plan shows the general site layout. Figure D-1 includes directions to the medical facility.

9.1.6 Fire

On notification of a fire onsite, site personnel will assemble at the decontamination line. The fire department will be alerted, and personnel will move to a safe distance from the involved area. Personnel should try to extinguish small fires with the onsite fire extinguisher. In all cases the fire department should also be notified. The following CHSPs apply to fire protection:

- CHSP 20.1, Fire Prevention;
- CHSP 20.3, Fire Extinguisher Requirements; and
- CHSP 20.2, General Fire Protection.

9.1.7 Personal Protective Equipment Failure

If any site worker experiences a failure or alteration of PPE, that person and his or her buddy will immediately leave the EZ through the decontamination line. The HSO should be notified. Reentry will not be permitted until the equipment has been repaired or replaced.

9.1.8 Other Equipment Failure

If any other equipment onsite fails to operate properly, notify the HSO, who will determine in conjunction with the SM the effect of this failure on the health and safety of continuing operations onsite. If the failure affects the safety of personnel or prevents completion of the work plan tasks, personnel will leave the EZ until the situation is evaluated and appropriate actions are taken.

9.1.9 Evacuation

If an evacuation is necessary, the steps below shall be followed:

- Personnel are to leave the work location (upwind) and assemble at a designated assembly point (if safe) after detecting the emergency signal for evacuation.
- If an emergency situation is of concern to local site personnel, notify the HSO, who will notify client contact(s) of the emergency.

- If appropriate and safe, the HSO and a "buddy" are to remain at or near the sampling location after the location has been evacuated to assist local responders and advise them of the nature and location of the incident.
- The HSO is to account for field team members at the assembly point.
- The SM is to complete an incident report (as described in Section 9.2) as soon as possible after the occurrence.

Evacuation routes and assembly points will be documented by the HSO or SM during the employee health and safety briefing and daily tailgate meetings. Such locations shall minimize spread of contamination. Decontamination will be performed following evacuation to minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.

9.2 EMERGENCY RESPONSE AND ACCIDENT FOLLOW-UP

As soon as possible following an incident or emergency, the SM, or designee is to *directly* notify the PHSM, the PjM, and the client. Refer to CHSP 5.0.

The SM should be prepared to provide the following information:

- HSO name;
- SM name;
- project name and project number;
- exact location of incident;
- name and employer of victim(s);
- nature and extent of injuries;
- if victim(s) was transported offsite for medical treatment, then name and address of medical facility and name of treating physician; and
- telephone number where the SM can be contacted during next 24 hours.

9.2.1 Exposure to Bloodborne Pathogens

The following procedures will be followed if a potential exposure to bloodborne pathogens occurs:

]	The HSO or SM must be notified immediately during the wor	rk shift	when a	ı first
	aid incident occurs.			

	The HSO or SM shall follow the required reporting procedures to the PHSM as listed above.
	The report shall include the names of all first aid providers who rendered assistance, regardless of whether PPE was used, and shall describe the first aid incident, including time, date, and type of PPE used.
	The description must include a determination if, in addition to the presence of blood or other potentially infectious material, an "exposure incident" (as defined by 29 CFR 1910.1030) occurred. This determination is necessary to ensure that the proper postexposure evaluation, prophylaxis, and follow-up procedures required by CHSP 11.2 are made available immediately when there has been an exposure incident.
	A Hepatitis B vaccination must be offered to all employees who have occupational exposure to blood or other potentially infectious materials.
	The report shall be recorded on the First Aid Register.
For	radditional information, refer to CHSP 11.2

9.2.2 Site Manager's Investigation

An initial accident investigation will begin at the discretion of the SM in accordance with CHSP 5.1, Accidents, Injuries and Illnesses. At a minimum, the scene will be secured (no movement of material or equipment will be made until a review of the accident is completed), and signed statements from witnesses will be maintained.

9.3 SPILL OR RELEASE PROCEDURES

See Section 9.2.2 for reporting requirements. Follow CHSP 11.7, Spill Containment. Also follow CHSP 7.3.6, Drum Handling where applicable.

If spills occur, notify the HSO and SM immediately. The HSO or SM will be responsible for ensuring necessary notifications are given to the PHSM and the client. The client and Jacobs will determine the strategy for notifying regulatory agencies.

9.4 VEHICLE ACCIDENT

The HSO and SM shall be promptly notified of any accidents involving vehicles at the facility. The SM will be responsible for notifying the client. The SM implements CHSP 5.2.

Follow the actions of section 9.1.4 if any personnel are injured in the accident.

9.5 EMERGENCY RESPONSE CONTACTS

This section lists the emergency contacts and describes the location of the nearest emergency medical facility.

Contacts to notify in an emergency are as follows:

Contacts	Telephone	Radio
Fire	911	
Police	911	A STATE OF
Ambulance	911	
Poison Control Center		
CHEMTREC	(800) 424-9300	

Client contacts and Jacobs project management contacts are listed in the project-specific SPA.

Note: The SM will verify above telephone numbers.

10.0 RECORD KEEPING

Records documenting the safety program will be maintained as required by CHSP 1.5 Health and Safety Program Implementation Responsibilities, CHSP 5.0 Accident and Incident Reporting and Recordkeeping, CHSP 4.2 Medical Monitoring and Training Tracking System, and as associated with other CHSP's. Logs and records will include documentation of exams, training, medical information, safety meetings, injuries, illnesses, and emergency events. Record keeping in the field includes maintaining a health and safety logbook and calibration logs. Copies of training records will be kept at the site. The Jacobs Training and Medical Monitoring wallet card provides proof of "active" field status.

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11.0 PLAN APPROVAL

This site safety plan has been written for the exclusive use of Jacobs Engineering Group Inc., its employees, and subcontractors. The plan is written for the specified site conditions, dates, and personnel and must be amended if these conditions change. The SPA, Table D-9, presents the approval form for the Project-Specific Safe Plan of Action and Table D-10 is the approval form for modifications to the Project-Specific Safe Plan of Action.

Prepared by:	Date:
Concurrence by:	Date:
Concurrence by:	Date:
Dian Approved by	Date:

Prepared for:



State of Oregon Department of Environmental Quality

Expanded Preliminary Assessment Data Report

Marine Finance Site Portland, Oregon

FINAL

Coul, or or

October 2000

ODEQ Task Order No. 90-97-15 Jacobs Project No. 05-V822-00

Prepared by:



1527 Cole Blvd., Bldg. 2 Golden, CO 80401 (303) 462-7000

90-97-20

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NORTHWEST REGION

OCT 3 0 2000

DEPT OF ENVIRONMENTAL QUALITY RECEIVED

ACRONYMS

amsl above mean sea level
BEHP bis(2-ethylhexyl)phthalate

BES Bureau of Environmental Services

bgs below ground surface

CERCLIS Comprehensive Environmental Response, Compensation, and Liability Act

Information System

CFR Code of Federal Regulations

cm centimeter

DEQ Oregon Department of Environmental Quality

DRO diesel range organic compounds

DPT direct push technology

ECSI Environmental Cleanup Site Information

eV electron volt

GRO gasoline range organics HCID hydrocarbon identification

HOT heating oil tank

HPAH high molecular weight polynuclear aromatic hydrocarbon

IDW Investigation derived waste

kg kilogram

LPAH low molecular weight polynuclear aromatic hydrocarbon

LUST leaking underground storage tank

m² square meter

MCL maximum contaminant level

mg milligram

MS/MSD for matrix spike/matrix spike duplicate

OAR Oregon Administrative Rule
ORS Oregon Revised Statutes
PA preliminary assessment

PAH polynuclear aromatic hydrocarbon

PBSE PBS Environmental
PCB polychlorinated biphenol
PID photoionization detector
POL petroleum, oils, and lubricants

ppm parts per million

PRG preliminary remediation goal

PVC polyvinyl chloride

QA/QC quality assurance/quality control

RBC risk-based concentration

RL reporting limit RM River Mile

RRO residual range organic compounds

ACRONYMS

SVOC	semivolatile organic compound	grafica de la compañía
TBT	tri-butyltin	July stevensky state of the sta
TOC	total organic carbon	
TPH	total petroleum hydrocarbons	ending the property of
USCG	U.S. Coast Guard	and the second of the second
USCS	Unified Soil Classification System	property of the first of first
UST	underground storage tank	e in the second second
USACE	United States Army Corp of Engineers	\$ (P) 1 (A) 10 (A) 10 (A) 10 (A) 10 (A) 10 (A) 10 (A) 10 (A) 10 (A) 10 (A) 10 (A) 10 (A) 10 (A) 10 (A) 10 (A)
USEPA	United States Environmental Protection	n Agency () and the state of t
VOA	volatile organic analysis	property of the state of the st
VOC	volatile organic compounds	मुद्दा विकास का से समुका अधिक
XPA	expanded preliminary assessment	ng mga kalasasasasasan da bali
μg	micrograms	stein i sattocki.
		自由企业 经存储 计一种介

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Berton Buckyt Car.

1.0 INTRODUCTION

This Expanded Preliminary Assessment (XPA) Report presents the results of the investigation performed at the Marine Finance site from 07 August through 10 August 2000 in accordance with the Preliminary Assessment (PA)/XPA Work Plan (XPA Work Plan) (Jacobs Engineering Group Inc. (Jacobs) 2000). The purpose of the XPA investigation was to determine whether hazardous substances have been or are threatened to be released at the Marine Finance facility and have been transported to the Willamette River sediments.

1.1 PURPOSE

A PA is required by Oregon state law at sites where a significant threat to human health or the environment is suspected from a release of hazardous substances (as defined in Oregon Revised Statutes (ORS) Chapter 465.200). Authority for conducting a PA is provided in ORS 465.245 and Oregon Administrative Rule (OAR) 340-122-072. A PA is designed to determine whether a site is releasing, has released, or could release hazardous substances to the environment and whether a response action is required. The objectives of a PA include identification of potential hazards at a site, identification of areas at a site that require immediate action, and establishment of priorities for areas on a site requiring further investigations. An XPA is considered necessary to determine if a release has occurred or may occur that could endanger human health or the environment.

This PA/XPA investigation was conducted under the Oregon Orphan Site Account for the Oregon Department of Environmental Quality (DEQ). The Orphan Site account was created to investigate and clean up hazardous substance contamination at high priority sites where the responsible party is unknown or is unwilling or unable to undertake the required removal or remedial actions (ORS 465.381). The Marine Finance site was designated an Orphan Site on 06 July 2000.

Seven exploratory probes were performed using direct push technology (DPT) techniques to collect five subsuface soil samples and seven groundwater samples for chemical analysis. Additionally, surface soil samples were collected at 10 locations, sediment samples were collected at six locations, and surface water samples were collected at two locations.

1.2 REPORT ORGANIZATION

The XPA Report has been organized into the following sections:

Section 1.0, Introduction, which includes information about the site, location, who performed the work, for whom the work was performed, and under what authority.

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Section 2.0, Background, which includes a brief description of the physical characteristics of the site and immediately adjacent areas, current and historical use, regional geology, and apparent problems at the site.

Section 3.0, Project Description, which summarizes the objectives of the sampling event, sampling criteria and rationale, and sampling procedures including any deviations to the work plan.

Section 4.0, Sampling Results, which includes tabulated data results and a brief narrative summary of all analytical data categorized by media and a summary of data quality and usability.

Section 5.0, Summary, which summarizes the results of the XPA investigation.

Section 6.0, References, which includes citations to all documents and information referenced in this report.

Appendices include:

• Appendix A, Comments to the Draft Report. This appendix presents the comments to the draft version of this document.

Company of the Masser and the History

- Appendix B, Photographs. This appendix presents representative photographs of the work performed at the site.
- Appendix C, Field Forms. This appendix includes all field forms completed during the investigation, including sample collection forms, borehole logs, as well as copies of the field logbooks.
- Appendix D, Analytical Data Reports. This appendix includes all analytical data reports organized by media as well as the chains of custody and data verification reports.
- Appendix E, Comparison Criteria Sources. This appendix includes tables from which comparison criteria used in the text were obtained.

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2.0 BACKGROUND

The following sections provide a summary of the Marine Finance background, but a more comprehensive discussion and appendices with supporting documentation are included in the XPA Work Plan (Jacobs 2000).

2.1 SITE LOCATION AND DESCRIPTION

The Marine Finance site is located along the western edge of the Lower Willamette River adjacent to River Mile (RM) 6 in Portland, Oregon (Figure 2-1).. The region around the site is characterized by heavy industry along the river and a mix of residential, commercial, industrial, and recreational properties west of St. Helens Road. Most development along the Willamette River has occurred within the area referred to as the Portland Harbor, within which the Marine Finance site is located. Portland Harbor has been dredged to provide a shipping channel generally 300 feet wide and 40 feet deep from RM 0 to RM 11.8 (Caldwell and Doyle 1995). The river is deep, slow moving, and tidally influenced near the site. Shoreline features include steeply sloped banks covered with riprap or constructed bulkheads, with man-made structures such as piers and wharves extending out over the water. Many portions of the riverbed are steeply sloped and maintain substrates composed mainly of silts and sands because of dredging activities (Farr and Ward 1991).

2.2 SITE OPERATIONS AND INDUSTRIAL OPERATIONS IN THE PROJECT AREA

The Marine Finance site is currently used for administrative functions, warehouses, tow boat operations, and light construction activities according to information provided by representatives from Marine Finance Corporation to DEQ on 22 March 1999. Structures at the site currently consist of two large metal-clad Quonset huts on concrete slabs, a wood-frame modular office building, a small metal-clad trailer house, a small wooden shed, a floating-home builder's dock, as well as a gangway and floating facilities owned by a tow boat company. A concrete slab foundation from a former warehouse building in the southern portion of the property still exists in part or in its entirety under some overlying soil. There are currently two docks onsite north of the St. John's Bridge. The site is currently occupied by five businesses which all lease space on a month-to-month basis:

- Transloader (Transversal) International Import/Export business. Transloader International
 occupies a trailer for its office operations and the south Quonset hut for warehousing of
 merchandise.
- Hendren Tow Boat Company Tugboat business. Hendren Tow Boat Company operates
 on Marine Finance property south of the St. John's Bridge. Since Hendren Tow Boat
 started operations at the site in 1993, it has been used as a tug boat dock. There are

currently several floating structures/docks in the river adjacent to the site. Maintenance of its vessels is performed onsite.

- Mark Even Construction Houseboat construction. Mark Even Construction constructs houseboats on the shoreline of the Willamette River using a dock at the northern end of the property and has support operations and material storage in the adjacent area.
- Black Cat Studios Sculptors studio space in the northern end of the north Quonset hut.
- NW One Design Sailboat construction in the southern end of the north Quonset hut.

A 1993 Phase One Report, which was prepared by PBS Environmental as an environmental property assessment report, indicates that the property has been used by various marine construction companies and tow boat/barge companies since the 1920's or earlier (PBS Environmental (PBSE) 1993). In the past the site also had a modest warehouse in the southern portion of the site as well as smaller buildings, such as office buildings, a tavern, and a private residence. Between 1936 and 1940 the area was built up with fill material. The present day Quonset huts were constructed sometime before 1957. Much of the site was leased to two metal salvage companies from 1988 until 1993. The PBSE report indicated that scrap metal covered much of the storage yard and direct observation of the ground surface was difficult (PBSE 1993). Road base material was noted during the present investigation.

In 1926, the south parcel was occupied by Jacobsen Construction Company, which performed pile driving, dock work, and bridge building. Jacobsen had an equipment warehouse with an office and tool room in the south end of the parcel, located between the river and the railroad tracks. This building was serviced with electric power, stove heat, and city water. Toilets and basins drained directly into the river. A dock and an overhead crane was located south of the warehouse. The adjacent property to the south was occupied by government moorings (PBSE 1993).

A cross-river ferry slip and landing was present through the 1920's on the north parcel near the present location of Mark Even Construction. The ferry apparently operated until approximately 1932 when the St. Johns bridge was constructed. A tavern, a private dwelling, and a garage were located just south of the bridge between the railroad tracks and St. Helens Road in 1932. Jacobsen continued to occupy the remainder of the south parcel. Houseboats occupied the shoreline on the north parcel.

By 1943, the south parcel was occupied by Portland Tug and Barge, which was owned by Jacobsen Construction. The equipment warehouse remained, and a new one-story office building was constructed on the north parcel and connected to the sewer.

By 1948, fill material had been placed on the north parcel bringing it to close to its present day elevation. The U.S. Army Corps of Engineers (USACE) has no records of fill disposal from river dredgings on the property, which indicates that the fill material was likely obtained from

private dredging operations (PBSE 1993). A 1948 aerial photo shows two elongated buildings, which appear to be warehouses, side-by-side in the center of the north parcel. In 1951, a temporary restroom connected to a septic tank was constructed on the property (PBSE 1993).

General Construction Company purchased the property from Jacobsen Construction Company in approximately 1953. The address for Portland Tug & Barge (8444 N.W. St. Helens Road) was listed as vacant starting in 1953 until 1957. At approximately this time, the Corps of Engineers occupied the government mooring property to the south. The present-day Quonset huts were constructed before 1957 based on review of the aerial maps although the PBSE report indicates construction in 1959 (PBSE 1993). The original warehouse on the south parcel was demolished in October of 1965.

In 1972, a permit was filed by General Construction Company with the City of Portland for the grading, surfacing, and fencing of storage areas, and construction of dolphins, floats, ramps, and an oil storage building for lubricants and greases. Precise locations are uncertain, but aerial photographs indicate that several ancillary structures were constructed on the east sides of both Quonset huts between 1971 and 1972. Additionally, much additional storage east of the Quonset huts and on the southern portion of the property is noted in 1972. Later that year, an office trailer was added on the north parcel. In 1979, a sewer connection permit was filed by General Construction for a trailer on the south parcel (PBSE 1993).

The property was purchased from General Construction in 1988 by West State, Inc. The buildings and property were leased in 1989 to Clydes Ferrous Metal Salvage whose office space was in the south half of the north Quonset hut, and Abrams Scrap Metal whose office space was in the south Quonset hut. Scrap metals were stored in the area east of the Quonset huts. A diving and construction company called Dutra Devine occupied the north end of the north Quonset hut and the modular office building near the north dock. Prior to Dutra Devine, the north end of the north Quonset hut was occupied by Western Boiler Repair.

Three underground storage tanks (UST) located immediately east of and adjacent to the southern Quonset hut (Figure 2-2), which were previously used by General Construction Company, were removed from the site in 1988 immediately after the purchase of the property by West State, Inc. (Dames & Moore 1988). Two USTs, a 20,000-gallon and a 10,000-gallon tank, stored diesel fuel and the third, a 5,000-gallon UST, contained gasoline. A fuel pumping island was located near the USTs by the southern Quonset hut. A fuel line also led to the dock north of the St. Johns Bridge and may have supplied fuel for river vessels and/or been a supply line for the USTs. Contaminated soil was excavated from the tank pits to depths of 15 to 26 feet below ground surface (bgs). Additional test pits were dug along the former route of the product lines, and more contaminated soil was removed. The removal project received a "No Further Action" letter from the DEQ in February 1989.

2.3 PREVIOUS INVESTIGATIONS

The site is located adjacent to a 6-mile stretch of the Lower Willamette River between the upstream ends of Sauvie Island (RM 3.5) and Swan Island (RM 9.5) where the USEPA conducted a sediment study in 1997 (USEPA 1998). This study included collection of 187 near-shore sediment samples from either shallow (6 to 17 centimeters (cm)), or deep (55 to 139 cm) sediments. Most of the samples (150) were collected from the shallow horizon. All samples were analyzed for total metals, semi-volatile organic compounds (SVOCs), total organic carbon (TOC), and sediment grain size. Selected samples were also analyzed for organotins (specifically tributyltin (TBT)), pesticides, polychlorinated biphenols (PCB), chlorinated herbicides, and chlorinated dioxins and dibenzofurans (ODEQ 1999, USEPA 1998).

One of the subsurface sediment samples (SD055-C) was collected adjacent to the Marine Finance site from a depth of 0 to 90 cm. Another shallow sediment sample (SD055) was collected downstream, and both a shallow (SD057) and subsurface (SD057-C) sediment sample was collected upstream of the Marine Finance site. The results exceeding the Portland Harbor Sediment Baseline Maximum Value included copper, lead, mercury, nickel, zinc, 2-methylnaphthalene, benzoic acid, carbazole, dibenzofuran, total low molecular weight polycyclic aromatic hydrocarbons (LPAHs), total high molecular weight polycyclic aromatic hydrocarbons (HPAHs), and TOC (Table 2-1). The Marine Finance sample exceeded baseline values for 12 analytes, while the two upstream samples (SD057 and SD057-C) exceeded baseline values for two and four analytes, respectively. The downstream sample did not exceed the baseline values for any of the analytes (ODEQ 1999). The two nearby upstream sites which are currently undergoing investigation are the U.S. Moorings Site, and the Gasco Site (ODEQ 1999).

The Level One (Phase One) Environmental Property Assessment Report (PBSE 1993), found that various items stored in the yard presented potential sources of contamination, such as empty drums taken in as salvage which once contained hazardous material, as well as electrical transformers and metal shavings. The updated PBSE 2000 report stated that the bulk of the scrap metal in the yard had been removed, but that a large number of small pieces of plastic and metal were present within the surface soils of the former metal salvage storage yard.

Three USTs were removed from the facility in 1988 and soil samples collected (Dames & Moore 1988). The soil confirmation samples collected from the UST excavations showed total petroleum hydrocarbon (TPH) concentrations below tanks 1 and 2, which each stored diesel fuel, of 5900 parts per million (ppm) and 2200 ppm respectively. The clean up standards in effect at the time were applied on a case-by-case basis and therefore a "clean up" criteria of 100 to 1,500 ppm TPH in the soils was suggested by the DEQ for the site. Contaminated soils were removed from the UST locations until TPH levels in the soil were acceptable to the DEQ. On 17 February 1989 DEQ issued a No Further Action Letter to West States, Inc. (PBSE, 1993).

2.4 REGIONAL GEOLOGY AND HYDROGEOLOGY

The following discussion of the regional geologic setting is summarized from several published reports on the geology of the area. Beeson et al., 1991, Madin 1990, Tolan and Beeson 1984, Allen 1975, and Waitt 1985.

The geology of the Portland area is characterized generally by a broad structural depression or basin bordered by the Cascade mountains on the east and the Coast Range mountains on the west. Geologic formations in the basin are also folded and dissected by a number of northwest-trending faults. The Tualatin -mountains form a northwest-trending anticlinal ridge that is faulted along its eastern flank by the Portland Hills fault. The Willamette River flows along the base of the eastern side of the Tualatin Mountains. A number of additional faults are located approximately parallel or perpendicular to the Portland Hills fault and are mapped along or near the Tualatin mountains. An inferred graben is identified immediately southeast of the site (Beeson et al 1991).

A description of the geologic formations of regional significance that may be present at or near the site is presented below (from oldest to youngest):

- Columbia River Basalt Group The Portland basin is underlain by the Columbia River Basalt Group, which consists of flood basalt that erupted 17 to 6 million years ago. These Miocene-age flood basalts are characterized by a thick sequence of dense basalt flows that are separated by permeable interflow zones. These interflow zones are generally highly productive aquifers. This unit has been folded and faulted and forms the Tualatin Mountain uplands southwest of the site. The Columbia River Basalt Group dips steeply to the northeast near this area and is estimated to extend to a depth of 300 to 450 feet below (Madin 1990), with a thickness of more than 650 feet. Fluvial sediments of the Sandy River Mudstone and the Troutdale Formation overlie the Columbia River basalt flows.
- Sandy River Mudstone-These deposits of Miocene to Pliocene age are friable to moderately indurated siltstone, sandstone, and claystone derived from an ancestral Columbia River that flowed into the Portland basin from the east. The deposits are found at thicknesses of up to 900 feet near Troutdale. However, outcrops of Sandy River Mudstone are not found near the Tualatin Mountains; the unit may pinch out or may have been scoured out in this part of the basin. The Sandy River Mudstone is overlain by the Troutdale Formation.
- Troutdale Formation-The Troutdale Formation is of Miocene to Pliocene age and in this area, consists of interbedded conglomerates and finer-grained deposits (Beeson et al. 1991). The Troutdale Formation is characterized by pebbly-to cobbly conglomerates consisting primarily of Columbia River basalt clasts with foreign clasts of volcanic, platonic, and metamorphic rocks, and interbeds: of micaceous arkosic and vitric sandstone (Tolan and Beeson 1984; Beeson et al. 1991). East of the Willamette River, outcrops of the Troutdale Formation are composed of locally derived pebbly to cobbly vitric sandstone with basalt clasts from Boring and Cascade lavas (Tolan and Beeson 1984). Major regional aquifers are established in the Troutdale Formation in much of the east Portland area. The thickness of the Troutdale Formation ranges from 900 feet near Troutdale to 200 to 300 feet in the western parts of the basin near the Tualatin Mountains (Beeson et al. 1991).

- Boring Formation-During Pliocene-Pleistocene time, volcanic lavas were erupted from approximately 90 vents throughout the Portland and Vancouver area. Where present, these volcanic deposits overlie the Troutdale Formation (Allen 1975). Boring lava thicknesses are greatest near source vents; however, thicknesses rapidly decrease and pinch out away from source vent areas.
- Catastrophic Flood Deposits-During the Pleistocene time, thick deposits of boulders, gravels, sands, and silts accumulated throughout the Portland basin, as a result of the repeated failures of glacial ice dams that impounded glacial Lake Missoula (Waitt 1985). These catastrophic flood deposits form the terrace surfaces in the eastern Portland area and are composed of three different facies. Coarse-grained pebble to boulder gravels and sand make up the core of these terraces, with fine grained sand and silt deposits mantling the coarser-grained facies. A finer-grained, interlayers silt, sand, and gravel facies is found adjacent to the Columbia and Willamette River channels. The coarse-grained facies reach maximum thicknesses of 100- to 130 feet. The channel facies typically range in thickness from 15 to 45 feet (Beeson et al. 1991).
- Recent Alluvium-Recent alluvium consists of Quaternary deposits or river sands, silts, and gravels deposited by the Willamette and Columbia rivers. These deposits are generally limited to the channel bottoms and floodplains of these rivers, and reach maximum thicknesses of about, 150 feet (Beeson et al. 1991).

In addition to these geologic formations, imported sand fill is common along many of the floodplain terraces adjacent to the Willamette and Columbia rivers. The source of this fill is primarily dredged material from the shipping channels in these two waterways.

The Marine Finance site is constructed on what is likely a combination of fill material and natural terrace deposits created by the Willamette River. Fill material has been noted to a depth of approximately 23 feet bgs in the area east of the Quonset huts (Dames & Moore 1988). Fill material was presumed during the XPA investigation ranging from approximately 18 feet bgs to approximately 23 feet. Wood chips were noted in at least two boreholes at the change in lithology between presumed fill and native material (Appendix C).

The terrace deposits overlie alluvium of the Willamette River basin unconformably. Both of these deposits are of Pleistocene age and are composed of indistinguishable unconsolidated stratified sand and silt. The sand ranges from very coarse to very fine, but is predominantly fine to very fine (Trimble 1957). The thickness of the terrace deposits at the site is approximately 10 feet thick while the alluvium deposits are known to have a maximum thickness of 100 feet (Trimble 1957). Columbia River basalts are believed to underlie these alluvial deposits at various depths near the site. Lacustrine deposits consisting of unconsolidated boulders, gravels, sand, and silt with a thickness on the order of hundreds of feet lie beneath the alluvium deposits. The Pliocene Troutdale formation typically underlies the alluvial deposits in the region and consists of conglomerate, sandstone, shale, and mudstone. The thickness of the Troutdale formation ranges from zero to more than 1,100 feet.

Comparison of aerial photographs from 1938 and 1940 and from 1961 and 1972 indicates that a significant amount of fill material had been added to the site during both of these periods.

Groundwater is approximately 16 feet bgs based on static water levels reported in nearby monitoring wells, geotechnical holes, and groundwater levels in the temporary well points installed during this XPA investigation. The hydraulic gradient presumably is toward the river based on the approximate water levels.

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3.0 PROJECT DESCRIPTION

3.1 SAMPLING OBJECTIVES, RATIONALE, AND LOCATIONS

A PA is required at sites where a significant threat to human health or the environment is suspected from a release of hazardous substances. An XPA is considered necessary to determine if a release has occurred or may occur and whether a response action is required (ORS 465.200 and OAR 340-122-072). An XPA is not, however, intended to be a full investigation or characterization of the site.

The purpose of this investigation was to provide a screening level evaluation of various media at the site. The sampling objectives were to collect samples from locations that have the greatest potential to be impacted by contaminants of interest to determine whether hazardous substances have been released or threaten to be released and may have been transported to Willamette River sediments. Activities therefore included collection and analysis of environmental samples from soil, groundwater, surface water, and sediment from locations placed using best professional judgment in the field to select the optimal sampling locations based on proposed sampling locations and the rationale as discussed below.

Based on historical data reviewed in Section 2.3, contaminants or potential concern at the site include petroleum, oils, and lubricants (POL), paints/antifoulant biocide paints, stains, solvents, herbicides, PCB, and metals.

Samples were collected from the groundwater, surface soil (0 - 6-inches bgs), subsurface soil, surface water, and sediment (Figure 3-1) in accordance with the work plan (Jacobs 2000): The rationale for each sample location is described below:

DPT Locations

- SB-1/GW-1: Located south of the St. Johns Bridge in an active drum storage area. Additionally, the northern end of the former warehouse was present in this area and the foundation was used to store unknown materials.
- SB-2/GW-2: Located in the southern portion of the site where the former warehouse was located. The foundation was used to store unknown materials.
- SB-3/GW-3: Located on the east side of the southern-most Quonset hut (the Transversal International building) near the bay door and south of the trailer. A former 5,000-gallon UST that stored gasoline and a former 10,000-gallon UST that stored diesel were removed from this area in 1988. Historic use of the Quonset hut is unknown, but releases or disposal of any hazardous substances used would likely contaminate soils immediately adjacent to the bay door.
- SB-4/GW-4: Located east of the southern-most Quonset hut (the Transversal International building). A former 20,000-gallon UST that reportedly contained diesel was removed from

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- this area in 1988 and a fuel pipeline that transported fuel between the UST and the dock also is located in this area.
- SB-5/GW-5: Located near the dock east of the Marine Finance office trailer. A fuel pipeline transferred petroleum from the USTs near the office trailer area to the dock area to fuel river vessels and likely was also used to transfer fuel from river tankers to the site USTs. Additionally, this location is downgradient of the former scrap metal storage area.
- GW-6: Located south of the Transversal International Corporation Trailer and away from the shore line enough to prevent influence from the river. This area is downgradient of the Quonset huts and other potential contamination sources, including a former scrap metal and material storage area.
- GW-7: Located approximately half way between the St. Johns Bridge and the Hendren Tow Boat Dock and away from the shore line enough to prevent influence from the river. As with GW-6, this area is downgradient of potential contamination sources and is located at a potential material storage area.

Surface Soil Locations:

- SS-1: Located south of the St. Johns Bridge in an active drum storage area near the location of SB-1. Additionally, the northern end of the former warehouse was present in this area and the foundation was later used to store unknown materials.
- SS-2: Located south of the St. Johns Bridge further south of SS-1 in another drum storage area. Additionally, the southern end of the former warehouse was present in this area and the foundation was later used to store unknown materials.
- SS-3: Located east of the Marine Finance office trailer south of the dock in an area where an oil stain was noted during the site visit and where scrap metal was historically stored.
- SS-4: Located west of the dock in the area where scrap metal was historically stored.
- SS-5: Located east of the Transversal International building (southern-most Quonset hut) adjacent to the bay door. Poor housekeeping, miscellaneous debris, and staining were noted during the site visit. Additionally, waste material and past releases from the Quonset hut may have been discharged (e.g. swept out the door or discarded).
- SS-6: Located on the east side of Blackcat Studios and the N.W. One Design. Soil staining and drums were noted during the site visit.
- SS-7: Located in the northern portion of the site near an area where carboy containers were discarded. The content of the carboys is unknown and historic contents that may have been released are unknown.
- SS-8: Located outside of the perimeter fence along the access road in the southern portion of the site where ODOT has material stored. The site has been noted as an unauthorized dumping area (PBSE 1993) and public access is not restricted in this area.
- SS-9: Located in the general area of the Mark Even Construction dock. A discretionary riverbank sample was collected near a general materials staging area adjacent to the dock as indicated in a photograph in Appendix B.
- SS-10: This discretionary riverbank sample was collected in the southern portion of the property in an area denuded of vegetation.

• SS-11: Located south of the St. Johns Bridge adjacent to the Willamette River. A discretionary riverbank sample was collected near a toppled drum, which was labeled "Resin" and flammable liquid, with a battery (photograph in Appendix B).

Surface Water and Sediment Locations

- SD-1/SW-1: Located in the seep pool in the northern portion of the site northwest of Mark Even Construction. Both a surface water and sediment sample were collected from the seep to determine if potential contaminants from the upgradient areas are being transported to the seep and potentially to the Willamette River. As indicated in Section 3.0, general disposal, including carboys, was noted in the upgradient areas.
- SD-2: Located northwest and downstream of the Mark Even Construction dock (north dock) in an area where runoff from the site would accumulate.
- SD-3: Located north and downstream of the middle dock which was in use during the XPA investigation. Historic operations at the middle dock are unknown, but the upgradient area was used for scrap metal storage and an abandoned fuel line terminated adjacent to the dock.
- SD-4: Located north and downstream of the Hendren Tow Boat operations. Historic use of the dock is uncertain, but upgradient land use currently includes drum storage. The former warehouse was located upgradient and its foundation was later used to store materials.
- SD-5: Located north of, in the center of, and downstream of the Hendren Tow Boat operations.
- SD-6: Located approximately 100 feet upstream of the Hendren Tow Boat operations as a baseline sample for the Marine Finance site.

3.2 SAMPLING METHODS AND ANALYTICAL REQUIREMENTS

3.2.1 SAMPLING METHODS

Surface Soil Sampling

Surface coverings, such as vegetation, debris, rocks, and obvious contamination (e.g. stained soil) were removed using hand trowels or picks to remove the hard packed road-base material. Volatile organic compound (VOC) samples were collected immediately to minimize the loss of volatiles using EnCore® sampling devices in accordance with SW5035 extraction and preservation methods. The surface soil interval, which was from the ground surface to approximately 6-inches bgs, was selected based on the area closest to the surface in which a sample could be collected without significant interference from vegetation, debris, rocks, and obvious contamination. Vegetation, debris, and rocks were removed from the sample aliquot to the extent practicable. Samples, other than VOCs, were collected with decontaminated stainless steel spoons and transferred a stainless steel mixing bowl for homogenization and subsequent transfer to sample containers.

Composite samples were collected from locations SS-3, SS-4, and SS-6 as indicated in the XPA Work Plan (Jacobs 2000). The sample aliquot was homogenized in a stainless steel mixing bowl and then transferred to the sample containers. The samples for VOC analysis, however, were collected as grab samples using an EnCore® sampler from a single point to minimize loss of volatiles.

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Subsurface Soil Sampling

The subsurface soil samples were collected by driving a 2-inch diameter (macro core), 4-foot long, push probe sampler equipped with a polyvinyl chloride (PVC) liner. The pin attaching the sampler's tip was released allowing the tip to slide up inside the sampler when the top of the sample interval was reached. The sampler was then driven another 4 feet to collect a soil core. Vapor measurements were made on the soil using a photoionization detector (PID) equipped with a 10.6 electron-volt (eV) probe to screen for VOCs. Sample cores were collected continuously for lithologic logging purposes using the Unified Soil Classification System (USCS) (U.S. Army Corps of Engineers (USACE) 1953), which is reported in Section 4.0, and for screening of the entire bore for evidence of contamination (i.e. PID screening and observation of olfactory and visual indications).

The soil core interval with the highest PID reading or the most contaminated interval based on visual, olfactory, and/or best professional judgment was then collected in appropriate sample containers for submission for analytical testing as indicated in Table 3-1. The rationale for collection of soil from a specific interval follows:

- SB-1: Collected from the 6-8 foot bgs interval because of a PID reading of 0.7 ppm. No staining or odor was noted, however, in this interval or in any interval at SB-1.
- SB-2: Collected directly above the groundwater table at 14-16 feet bgs because no PID reading above 0 ppm were noted at any interval within the borehole nor was any staining or odor noted. The interval directly above the groundwater was therefore selected to determine any soil contamination closest to the groundwater for potential leaching.
- SB-3: Also collected directly above the groundwater table at 18-20 feet bgs for the same reasons as SB-2.
- SB-4: Also collected directly above the groundwater table at 20-21 feet bgs for the same reasons as SB-2 and SB-3.
- SB-5: Collected at 18-18.5 feet bgs because of a PID reading of 1.8 ppm. PID readings above 0 ppm started at 11 feet bgs and continued to 18.5 feet bgs ranging from 0.2 ppm to 1.8 ppm. No staining or odor was noted, however, in this interval or any interval at SB-5. This deeper interval was also selected because it was closest to the groundwater.

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Groundwater Sampling

Groundwater grab samples were collected upon completion of the DPT probe to approximately 3 feet below the water surface and re-fitted with a temporary well point. However, some boreholes were driven several additional feet when water recovery was inadequate. Polyethylene tubing was attached to the well point and threaded through the drill string during advancement. After reaching the total depth, the well point was driven an additional 2 feet into native soil.

Temporary well points were purged of three hole volumes using a vacuum pump prior to sampling as appropriate. However, poor water recovery prevented purging of 3 volumes at all locations. After purging, groundwater samples were collected using the same methodology used for purging except that VOCs were collected using a hand-operated inertia pump.

Surface Sediment Sampling

Subtidal surface sediment samples were collected using a stainless steel 0.1 square meter (m²) van Veen grab sampler suspended from the stern of a 30-foot aluminum hull boat in accordance with the XPA Work Plan (Jacobs 2000). A single grab generally produced sufficient volume for the required analyses, although several attempts were required to obtain any sample aliquot. It was surmised based on the field crew professional experience that most of the locations had riprap and other debris that often prevented sediment recovery. Personnel from the Mark Even Construction Company confirmed this based on their dives in the area. Penetration depths ranged from 0 cm to approximately 20 cm.

Accepted samples were placed in a stainless steel bowl for homogenization and then transferred to sample containers using a stainless steel spoon. Observations of sediment composition were made and recorded on sample collection forms (Appendix C).

Subsurface Sediment Sampling

The subsurface sediment samples were collected using a 2-inch diameter gravity corer configured with a 3-foot barrel and a 150-pound weight stand. Up to 12 attempts were made at each location to obtain any penetration. As stated above, most locations had riprap and submarine survey of the channel in the sample locations indicated a relatively steep slope. The nosecone was deformed on several occasions as indicated in a photograph in Appendix B. Therefore, it was surmised that the gravity corer was bouncing off of the rip rap and/or deflecting off of rip rap or debris on the channel slope. Core recovery varied throughout the study area from several inches to 2-feet. A summary of gravity core recovery is listed in Table 3-2. The gravity corer was initially dropped (free-fall) at approximately 4 feet above the sediment at each location and then dropped from higher elevations to obtain adequate sample recovery. Core collection observations were recorded on the sample collection forms and in the field logbooks (Appendix C).

Sediment from each core liner was extruded into a decontaminated stainless steel bowl by tipping the liner and tapping the liner as necessary. Observations of the sediment were noted both through the clear liner and upon extrusion. The sample was then homogenized in the bowl and transferred directly to sample containers.

Surface Water Sampling to Take the Sample of the same

The surface water samples were collected of surface water discharge from the water body (the seep) or flow (stand-pipe) in a Teflon beaker. The aliquot were collected in a reasonable manner that reduced aeration of the water to minimize offgassing of volatile organics. The aliquot was immediately transferred directly to the sample containers.

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3.2.2 ANALYTICAL REQUIREMENTS

All samples were analyzed in accordance with the methods and procedures specified in the XPA Work Plan (Jacobs 2000). Chemical analyses performed are listed in the data review, Section 4.0.

Duplicate samples were collected at a rate of one in 20 for each matrix except groundwater, which were considered screening level data because of the collection methods. Matrix spike/matrix spike duplicates (MS/MSD) were also collected at a rate of one in 20 for each matrix except groundwater. Trip blanks were included in every cooler containing any volatile organic analysis (VOA) samples and temperature blanks were included in every cooler.

3.3 SAMPLE HANDLING, PACKAGING, AND SHIPPING

Samples were handled, packaged, and shipped in accordance with the XPA Work Plan (Jacobs 2000). All shipments were picked up by a laboratory courier the morning after sample collection with the exception of a sample shipment delivered by the field crew on a Saturday when no courier was available.

3.4 DOCUMENTATION

All field documentation, sample designation and labeling, and chain of custody procedures specified in the XPA Work Plan were followed. All documentation is presented in the attached appendices.

3.5 EQUIPMENT DECONTAMINATION AND INVESTIGATION-DERIVED WASTE

Decontamination procedures and IDW containment and storage specified in the XPA Work Plan were followed. One 55-gallon steel open-top drum with approximately 20 gallons of

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decontamination and purge water was stored immediately north and adjacent to the middle dock. This drum was labeled with a non-hazardous waste sticker and the accumulation start date, contact organization (ODEQ) and phone number, type/source of waste, and the quantity.

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logs as a fine, dark gray sand. Several silt lenses, or sandy silts, several inches thick were noted at various depths in most boreholes.

4.1.2 FIELD OBSERVATIONS

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Several qualitative observations were noted while performing the XPA investigation as noted below, reflected in the field documentation (Appendix C), and often shown in photographs in Appendix B.

Soils

Surface soil samples were collected from former and present drum storage areas and areas of present and presumed former material storage areas (photographs, Appendix B). Workers at the Marine Finance site were noted moving drums near the southern portion of the site during the XPA investigation activities, although the contents of these drums were unknown. It was surmised by the field crew that the drums were likely empty from observations of the workers easily moving drums by hand and that the activities were simply part of site maintenance.

Oil stains were noted in the surface soils at locations SS-3 and SS-6. Surface soil samples were collected from the intervals under the stained soils to determine petroleum constituents that may be leaching to the underlying soils from the stains.

Locations SS-3 and SS-4 were composite samples collected from areas of former scrap steel storage. While no large pieces of scrap remained, several small pieces of steel generally measuring less than a inch on any axis were noted in the area of SS-4.

Material and supply storage was noted adjacent to the dock near the Transversal International trailer and Mark Even Construction (photograph, Appendix B). It is likely that this area has historically been used for storage adjacent to the dock. Material stored during the XPA investigation was noted to be primarily scrap wood.

A denuded area was noted on the southern portion of the site during a site visit by representatives from ODEQ on 10 August 2000. A sample of opportunity, SS-10, was collected from this location within the area void of vegetation.

An empty drum labeled "Resin" and flammable liquid with a presumed lead-acid battery was found on its side at location SS-11 (photograph, Appendix B). A surface soil sample was collected immediately adjacent to the drum and battery.

4.0 SAMPLING RESULTS

The following sections present analytical data generated during the XPA investigation. The photographs, field sampling forms and logbook copies, and the data analytical results, which includes the chains of custody, and data verification reports are included in Appendices B through D, respectively.

4.1 DATA PRESENTATION

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Analytical data tables reporting all results exceeding the reporting limits (RL) for surface soil, subsurface soil, groundwater, surface water, and sediment samples are presented by contaminant category and media in Tables 4-1 through 4-14. Appendix D includes all data results for the samples as well as for the quality control (QC) and quality assurance (QA) samples. The raw data reports have been submitted to ODEQ separately.

4.1.1 SUBSURFACE SOIL LITHOLOGY

The boring logs describing the soil composition consistent with the USCS are included in Appendix C. In summary, most of the site is covered with approximately 12- to 18-inches of roadbase material that is tightly compacted underlain by what is suspected to be fill material to approximately the top of the water table. Native soil then underlies this fill material.

Most of the site within the perimeter security fence is covered with a roadbase material with limited vegetation other than along the edge of the riprap, around the Quonset huts, and at the northern and southern ends of the property. An employee of Mark Even Construction noted that the Willamette River flooded in 1996 and deposited up to 3 inches of sediments across the site up to the Quonset huts. Sediment was not obvious on the roadbase, but likely was cleared from the site, eroded, and/or mixed with the roadbase material.

Fill material across the site is presumed from examination of the historic aerial photographs as addressed in the XPA work plan (Jacobs 2000). Several boring logs indicate this presumed fill material to approximately the groundwater table, which is consistent with the aerial photographs. Additionally, two locations, SB-3 and SB-4, indicated wood chips at the bottom of the presumed fill material which may have been debris from past logging operations before the fill material was emplaced. The fill material was consistent in the borings and described as a fine- to medium-sand with trace silt, poorly graded, brownish-gray, and often dense. Brick fragments were noted in the presumed fill material at SB-3.

Much of the site closest to the present shoreline was formerly at or under the water line before the fill material was emplaced. The presumed native soil was generally described in the boring

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Surface Water and Sediments

Recovery of sediment was difficult at most locations both for samples collected using the van Veen sampler and the gravity corer. Proper functioning of the dredge sampler was ensured and often captured debris, but little sediment. Occasionally, a piece of debris such as wood chips or a small piece of riprap would prevent the jaws of the dredge from fully closing and hence any sediment was washed out upon retrieval. Gravity coring was also problematic. Submarine surveying of the channel indicated that the channel was steep and likely covered with riprap. An employee from Mark Even Construction indicated that he had dived in the area and that the area was covered with debris and riprap. Therefore, it is surmised that the steep channel bank, debris, and riprap interfered with both the dredge and the gravity corer. The nose cone of the gravity corer was badly misshapen presumably from hitting the riprap (photograph, Appendix B).

Location SD-2 near Mark Even Construction was relocated closer to the channel because several attempts failed to produce any recovery at the original location. An employee with Mark Even Construction indicated that an office building was formerly located adjacent to the shore at the northern boundary of the property but was demolished and the debris pushed into the area of the original SD-2 location. Dredging with the van Veen sampler only recovered wood chips in the original SD-2 location consistent with building debris; the wood chips also may have been from houseboat construction in the vicinity by Mark Even Construction and/or other former tenants.

Several sample collection attempts were also made at SD-3. Wood chips were repeatedly captured by the dredge, although little if any sediment was captured.

Sample collection at SD-5, which located immediately downgradient of Hendren Towboat near the bridge footer, was attempted several times both with the dredge and the gravity corer. An initial dredge attempt captured a gelatinous, silica-type material that was approximately an inch thick and approximately 4 inches by 6 inches. The material was translucent, could be easily ripped, and seemed to have been torn from a larger piece. No odor was noted. A photograph is included in Appendix B.

Additional sample recovery attempts at SD-5 produced a sheen on the surface water. The dredge sample aliquot had a sheen on the sediment and a sheen was also noted during decontamination of the dredge. The gravity core sample also produced a sheen when the aliquot was emptied into a mixing bowl and also produced a sheen on the surface water upon retrieval; the sample headspace reported 4.5 ppm measured by the PID. However, several other previous attempts with both the dredge and the gravity corer were made in a 30-foot by 20-foot area with no indication of a sheen. One of the previous gravity core attempts captured a bolt in this area (photograph, Appendix B) and wood chips were often captured by the dredge in this area.

The seep, which is location SD/SW-1, was noted to have various debris, including a rusted steel cable, wood, PVC or plastic pieces, aluminum foil, and a piece of electrical wire. However, it was also noted that several water bugs were living in the seep.

No rainfall events occurred during the XPA investigation, so no surface water runoff samples of opportunity were collected.

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Groundwater

Few notable observations were made concerning the groundwater. However, a sheen was noted while collecting water quality parameters at location GW-3, which is the location east of the southern Quonset hut near former gasoline and diesel USTs and a former fuel distribution island.

4.2. DATA EVALUATION . 1980 Particularly of the first of

This data evaluation includes assessment of (1) whether contamination was detected; (2) whether the concentrations are above background values, if available, and/or are above risk-based criteria as presented in Table 4-15. The risk-based values presented in Table 4-15 are only for the contaminants detected above the RL. Appendix E contains the sources of the background values and risk-based concentrations used in Table 4-15.

Risk-based criteria are not available for TPH, however. Therefore, the concentrations are reported but not evaluated against criteria.

No background samples were collected at the site. The only known background values available in the area are for sediments from the Portland Harbor Study (USEPA 1998) and for metals in soils for Clark County, Washington, and are presented in Table 4-15.

4.3 ANALYTICAL RESULTS

The analytical results above the RL for all samples collected from all media at Marine Finance are presented in Tables 4-1 through 4-13 and all data are presented in Appendix D. Copies of the raw data have been provided to ODEQ separately.

- Table 4-1, Total Petroleum Hydrocarbon Hits Soils
- Table 4-2, Volatile Organic Compound Hits Soils
- Table 4-3, Semi-Volatile Organic Compound Hits Soils
- Table 4-4, Metal Hits Soils
- Table 4-5, Tri-Butyltin Hits Soils
- Table 4-6, Volatile Organic Compound Hits Water

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- Table 4-7, Semi-Volatile Organic Compound Hits Water
- Table 4-8, Metal Hits Water
- Table 4-9, Total Petroleum Hydrocarbon Hits Sediment
- Table 4-10, Semi-Volatile Organic Compound Hits Sediment
- Table 4-11, Metal Hits Sediment
- Table 4-12, Tri-Butyltin Hits Sediment
- Table 4-13, Polychlorinated Biphenyl Hits Sediment

The data, with the exception of metals, are also presented by media on the site maps in Figures 4-1 through 4-5. The following data review presents the results exceeding the RL and compares the results to risk-based concentrations (RBCs). The most conservative value for protection of human health or ecological resources was used and is presented in Table 4-15.

4.3.1 SURFACE SOIL

The analytical results for all surface soil locations are presented in Tables 4-1 through 4-5 and are depicted graphically on the site map in Figure 4-1.

TPH

Diesel-range organics (DRO) were detected above the RL in 7 of the 8 surface soil samples collected ranging from 28 milligrams (mg)/kilogram (kg) at location SS-5 to 1,400 mg/kg at location SS-6 (Table 4-1). Residual-range organics (RRO) were detected above the RL in 6 of the 8 locations ranging up to 9,800 mg/kg again at location SS-6. Sample location SS-1, which is near a drum storage area (Figure 4-1), reports only DRO at 35 mg/kg. The adjacent drum storage area, SS-2, reports DRO at 84 mg/kg and RRO at 250 mg/kg. Samples collected near the former metal storage area, SS-3 and SS-4, as well as a sample near the southern Quonset hut, SS-5, all report similar DRO and RRO results. SS-6, however, which is a composite sample near the northern Quonset hut collected under stained soil with a petroleum odor, reported the highest DRO and RRO values.

VOC

VOC was not detected above the RL at SS-1, SS-2, SS-7, SS-8, or SS-10 (Table 4-2). The only VOCs detected above the RL were (1) acetone at 66 micrograms (μ g)/kg at SS-6, which was collected under stained soil adjacent to the northern Quonset hut, while the USEPA Region 9 PRG for acetone in industrial soil is 6,200,000 μ g/kg; and (2) trichlorofluoromethane at 10 μ g/kg at SS-9, while the PRG for trichlorofluoromethane in industrial soil is 2,000,000 μ g/kg (Table 4-15).

SVOC

Several polycyclic (or polynuclear) aromatic hydrocarbon (PAH) compounds were detected in 6 of the 10 surface soil samples analyzed for SVOC (Table 4-3). Benzo(a)pyrene, which is typically a risk driver and has a PRG for industrial soil of 290 µg/kg (Table 4-15), was reported in samples from 3 locations, including SS-2 near the drum storage area at 0.91 µg/kg, SS-9 near the Mark Even dock at 0.79 µg/kg, and SS-7 near the seep at 470 µg/kg exceeding the PRG. Benzo(a)anthracene, which has a PRG of 2,900 µg/kg, was also detected at SS-2, SS-7, and SS-9 at 0.65µg/kg, 620 µg/kg, and 0.59 µg/kg, respectively. Benzo(b)fluoranthene, which has an PRG of 2,900 µg/kg, also was detected at SS-2, SS-7, and SS-9 at 0.87 µg/kg, 520 µg/kg, and 1.1 µg/kg, respectively as well as at SS-11 at 0.34 µg/kg. Several other PAH compounds were detected at these locations as well as at SS-6 and SS-8 as indicated in Table 4-3.

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LPAH, which includes the sum of concentrations for acenaphthene, acenaphthylene, fluorene, 2-methylnaphthalene, naphthalene, and phenanthrene, for surface soils detecting PAH above the RL ranged from 0.52 μg/kg at SS-9 to 653 μg/kg at SS-7. HPAH, which includes anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)pyrylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene, for surface soils detecting PAH above the RL ranged from 0.44 μg/kg at SS-8 to 4,346 μg/kg at SS-7. While no PRG criteria are available for LPAH or HPAH, the ODEQ Portland Harbor Apparent Baseline Values for sediment (Table 4-15) for LPAH is 700 μg/kg and for HPAH is 2,400 μg/kg. Only location SS-7 exceeds the HPAH criteria.

Bis(2-ethylhexyl)phthalate (BEHP), which is a common plasticizer used in the manufacture of PVC, was detected at 1.6 μ g/kg in SS-6 but the PRG for industrial soil is 180,000 μ g/kg.

Metals

Several metals were reported above the RL at all of the surface soil sample locations (Table 4-4). However, only 5 metals, including arsenic, chromium, copper, iron, and lead, exceeded the background concentrations for metals from Clark County, Washington, at several of the locations.

Locations SS-3 and SS-4 were collected as composite samples from the former scrap metal storage area. Four aliquots were collected on a grid with approximately 25-foot spacing and homogenized for each sample to ensure that a former metal storage area was sampled. Assuming that 3 of the 4 sample aliquot locations were collected in an aisle and only 1 location represented an actual storage site, the metal concentrations are multiplied by 4 for comparison to the background. Arsenic, chromium, copper, iron, lead, and manganese exceed the background concentrations at both SS-3 and SS-4 if the results are multiplied by 4. Aluminum is also exceeded at SS-4 if the results are multiplied by 4. However, only lead exceeds the background

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concentration at SS-3 if the analytical result itself is used. Chromium, copper, and lead exceeds background at SS-4 if the analytical results themselves are used.

Arsenic was reported above the background concentration of 6 mg/kg (Table 4-15) at 5 of the 11 surface soil locations ranging up to 13.3 mg/kg at SS-9. Chromium was reported above the background concentration of 27 mg/kg at 5 of the 11 locations ranging up to 81.3 mg/kg at SS-5. Copper was reported above the background concentration of 34 mg/kg at 6 of 11 locations ranging up to 270 mg/kg at SS-9. Iron was reported above the background concentration of 36,100 mg/kg in 3 of the 11 locations ranging up to 39,100 mg/kg at SS-2. Finally, lead was reported above the background concentration of 17 mg/kg at 9 of the 11 locations ranging up to 90.7 mg/kg at SS-2.

SS-10 failed to detect any metal above its background concentration. SS-1 only reported lead above the background and SS-8 only reported iron above background. Other surface soil locations reported at least three metals above background. All locations reported metal concentrations within an order of magnitude of the background concentration, although the copper concentration at SS-9 at 270 mg/kg was close to an order of magnitude greater than the background of 34 mg/kg. Most locations even reported metal concentrations within twice the background concentrations with the most notable exception being lead with 7 of 11 locations exceeding two times the background concentration.

PCB/TBT

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PCB was not detected above the RL in any of the surface soil samples (Appendix D).

TBT was sampled for and detected above the RL at SS-1, SS-2, SS-9, and SS-10 (Table 4-5). The tri-n-butyltin cation was detected at 8 μg/kg, 120 μg/kg, 110μg/kg, and 2 μg/kg at these locations, respectively. The tri-n-butyltin cation concentration was estimated at location SS-7 below the RL. The di-n-butyltin and n-butyltin cations were also detected in most of the samples, but at lower concentrations. The sum of all butyltin analogs, including the tetra-n-butyltin, tri-n-butyltin, di-n-butyltin, and (mono-)n-butyltin, was estimated at concentrations of 0.9 μg/kg and 2.5 μg/kg at SS-7 and SS-10, respectively, and was reported at 13 μg/kg, 147 μg/kg, and 166 μg/kg at SS-1, SS-2, and SS-9, respectively. While no risk-based criteria is available for TBT, the USEPA reported a maximum baseline value of 300 μg/kg in sediment in Portland Harbor (USEPA 1998).

4.3.2 SUBSURFACE SOIL

The analytical results for all subsurface soil locations are presented in Tables 4-1 through 4-5 and are depicted graphically on the site map in Figure 4-2.

Neither DRO nor RRO was detected above the RL at SB-1, which is near the drum storage area (Figure 4-2), or at SB-3, which is near the southern Quonset hut by a former diesel UST (Table 4-1). Gasoline range organic (GRO) was not detected at SB-3 either. DRO was detected at the other drum storage area (SS-2) at 27 mg/kg, but this value is close to the RL; no RRO was detected above the RL at SB-2.

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DRO and RRO was, however, detected at the other subsurface soil locations near another former diesel UST and fuel pipeline near the dock (Figure 4-2). SB-4, located near the former diesel UST, reported DRO at 490 mg/kg and RRO at 1,100 mg/kg. SB-5, which was offset several feet away from the original location but still immediately adjacent to a former fuel distribution line that was located during the utility clearance, reported DRO at 91 mg/kg and RRO at 260 mg/kg.

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VOC.

No VOCs were detected above the RL at any of the subsurface soil locations (Table 4-2).

SVOC

Pyrene was the only SVOC (PAH compound) detected above the RL at any subsurface soil location (Table 4-3). Pyrene, which has an PRG for industrial soil of 54,000,000 µg/kg (Table 4-15), was detected at 0.36 µg/kg at SB-1.

Metals

Several metals were detected above the RL in each of the 3 subsurface soil samples (SB-1, SB-2, and SB-5) (Table 4-4). However, no metal concentration at any location exceeded its background concentration(Table 4-15), although an estimated concentration for lead at SB-5 (19 mg/kg) did exceed the background concentration.

PCB/TBT

PCB was not detected above the RL in any of the subsurface soil samples (Appendix D).

Location SB-5 was the only subsurface soil location where TBT analysis was requested. Tri-n-butyltin, however, was not detected in SB-5 (Table 4-5). However, di-n-butyltin and n-butyltin were detected at 8 μ g/kg and 2 μ g/kg, respectively, at SB-5 for a total butyltin concentration of 10 μ g/kg. While no risk-based criteria is available for TBT, the USEPA reported a maximum baseline value of 300 μ g/kg in sediment in Portland Harbor (USEPA 1998).

4.3.3 GROUNDWATER

The analytical results for all groundwater locations are presented in Tables 4-6 through 4-8 and are depicted graphically on the site map in Figure 4-3.

TPH

TPH was not detected above the RL in the groundwater at any of the locations sampled, including GW-1, GW-2, and GW-5 (Appendix D).

VOC

Only carbon disulfide and chloroform were detected above the RL in any of the groundwater samples (Table 4-6). Chloroform, which has an PRG for tap water of 0.16 μ g/L (Table 4-15), was detected in GW-2 at a concentration 0.75 μ g/L. The only other VOC compound reported above the RL was carbon disulfide at 0.78 μ g/L and 0.53 μ g/L at GW-6 and GW-7, respectively. These concentrations did not exceed the RBC for tap water of 1,000 μ g/L.

SVOC

SVOC compounds were detected above the RL at 2 of the 7 locations, GW-4 and GW-5 (Table 4-7). Location GW-4, which is located immediately downgradient of a former diesel UST, reported phenanthrene, fluoranthene, pyrene, chrysene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene above the RL with the following above the RBC for tap water (Table 4-15):

- benzo(a)pyrene at 13 μ g/L while the RBC for tap water is 0.0092 μ g/L;
- chrysene at 9.9 μg/L while the RBC for tap water is 9.2 μg/L: and
- indeno(1,2,3-cd)pyrene at 11 μg/L while the RBC for tap water is 0.092 μg/L.

Phenanthrene was detected at a concentration of 18 μ g/L at GW-4, but no PRG for tap water is available. However, the ODEQ Ecological Risk Assessment Level II Screening Benchmark Value for phenanthrene is 0.0063 μ g/L.

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GW-5, which is located downgradient of GW-4 and adjacent to the fuel line that conveyed fuel between the USTs and the dock, also reported fluoranthene and pyrene above the RL but neither exceeded its PRG for tap water.

Metals

Several metals were detected above the RL in all 5 of the groundwater sample locations (Table 4-8). Antimony, arsenic, iron, lead, and manganese reported concentrations above the

RBC at many locations. GW-5 and GW-6 are downgradient of the former metal storage area and reported some of the highest metal concentrations at the site, including:

- arsenic from GW-5 at 36.9 μg/L while the RBC for tap water is 0.045 μg/L (Table 4-14);
- iron from GW-5 at 89,300 μg/L while the RBC for tap water is 11,000 μg/L;
- lead from GW-5 at 117 μg/L while the ODEQ Water Quality Criteria, Fresh Water Chronic Criteria, is 3.2 μg/L; and
- manganese from GW-5 at 3,160 μg/L while the RBC for tap water 880 μg/L.

Location GW-1, near a drum storage area, also reported some elevated metal concentrations in the groundwater, including the highest chromium concentration at the site at 39.3 μ g/L although the RBC is higher than this at 110 μ g/L. Iron was detected at 54,900 μ g/L and lead at 47.5 μ g/L while the RBC for iron is 11,000 μ g/L and the ODEQ Water Quality Criteria, Fresh Water Chronic Criteria, is 3.2 μ g/L. The other drum storage area, represented by location GW-2, also reported metals at similar but lower concentrations. A presumably downgradient location, GW-7, also reported similar concentrations for the metals, although manganese was reported at a higher concentration than GW-1 or GW-2 and also exceeded the RBC.

4.3.4 SURFACE WATER

The analytical results for all surface water locations are presented in Tables 4-6 through 4-8 and are depicted graphically on the site map in Figure 4-4.

VOC

No VOCs were detected above the RL in the surface water samples (Table 4-6).

SVOC

No SVOCs were detected above the RL in the surface water samples (Table 4-7).

Metals

Several metals were detected above the RL at the two surface water locations (Table 4-8), although no concentration exceeded its RBC (Table 4-15).

4.3.5 SEDIMENT

The analytical results for all surface soil locations are presented in Tables 4-9 through 4-14 and are depicted graphically on the site map in Figure 4-5. The sediment results are compared against the Portland Harbor Sediment Apparent Baseline Values (Table 4-15) (USEPA 1998).

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DRO was detected above the RL in 6 out of the 7 sediment samples collected on or adjacent to the Marine Finance site, including the sediment from the seep (SD-1) (Table 4-9, Figure 4-5). However, no TPH (DRO or RRO) was found in either shallow or deep intervals of the upstream location, SD-6. The highest DRO and RRO concentrations were found in the shallow and deep intervals downstream of the Hendren Towboat docks at location SD-5, which is the location where a sheen was noted during both dredge and gravity core sampling. The deep interval at SD-5 reported the highest concentration of both DRO and RRO of any sediment location at Marine Finance. Locations further downstream from this location reported diminishing concentrations.

SYOC

Several SVOC were detected above the RL in sediments (Table 4-10 and Figure 4-5) and several other compounds were estimated at concentrations above the MDL but less than the RL. All SVOCs detected could not be listed individually on Figure 4-5, so a total SVOC concentration is listed. The SVOCs detected were predominantly PAHs. Most compounds detected were found consistently in the sediments adjacent to the site with the highest SVOC concentrations in the deep interval at SD-5 immediately downstream of Hendren Towboat, although the upstream location (SD-6) generally reported lower concentrations than other locations in the Willamette River. The upstream location (SD-6) did not report any SVOC above the Portland Harbor Apparent Baseline Values (Table 4-15).

Both the LPAH and HPAH concentrations at SD-1 (the seep), SD-2S, and SD-3S were less than the Portland Harbor Apparent Baseline Values (Table 4-15) and no SVOCs at these locations exceeded the Portland Harbor Apparent Baseline Values. Note that no samples were obtained from the deep interval at locations SD-2 or SD-3. The seep location, SD-1, reported most of the same SVOCs detected in the sediments of the Willamette River adjacent to the site, although concentrations in the seep location were generally lower than those reported in the river samples. The exceptions included (1) benzo(a)anthracene reported at 120 μg/kg in SD-1 while the shallow river samples nearby in SD-2S and SD-3S were 93 μg/kg and 110 μg/kg, respectively; concentrations downstream of the Hendren Towboat dock were substantially higher (up to 22,000 μg/kg in the deep interval); (2) chrysene reported at 140 μg/kg versus 120 μg/kg and 130 μg/kg at SD-2S and SD-3S, respectively; (3) benzo(k)fluoranthene reported at 55 μg/kg versus 38 μg/kg and 41 μg/kg at SD-2S and SD-3S, respectively; and (4) benzo(a)pyrene at 120 μg/kg versus 100 μg/kg and 110 μg/kg at SD-2S and SD-3S, respectively.

SVOC concentrations were highest in both the shallow and deep intervals immediately downstream of the Hendren Towboat dock at location SD-5 (Table 4-10) while the upstream location, SD-6, reported substantially lower concentrations. The deep interval at SD-5

consistently reported higher concentrations of PAHs than the shallow interval. SVOC concentrations generally diminished downstream from SD-5 (Table 4-10 and Figure 4-5). LPAH and HPAH exceeded the Portland Harbor Apparent Baseline Values in both the shallow and deep intervals at both SD-4 and SD-5. LPAH and HPAH were exceeded by over an order of magnitude in the shallow interval at SD-5 and were exceeded by over two orders of magnitude in the deep interval at SD-5.

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Several PAHs and other SVOCs exceeded the Portland Harbor Apparent Baseline Values in both the shallow and deep intervals at both SD-4 and SD-5 (Table 4-10). Compounds exceeding the baseline values generally were consistent between these samples, including chrysene, benzo(a)pyrene. benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)anthracene, and indeno(1,2,3-cd)pyrene, phenanthrene, benzo(g,h,i)perylene, fluoranthene. Concentrations of these compounds at SD-4S, SD-4D, and SD-5S were generally within an order of magnitude of the baseline values. However, concentrations at SD-5D were generally over an order of magnitude greater than the baseline values and some compounds such as phenanthrene and pyrene each with a baseline value of 700 µg/kg were exceeded by over two orders of magnitude at SD-5D at 99,000 μg/kg and 110,000 μg/kg, respectively.

Several compounds were detected above the baseline values at SD-5 but not at any other location, although the compounds were generally identified even in the upstream location (SD-6). Dibenzofuran was detected in the deep interval at SD-5 at 1,200 μ g/kg and estimated above the MDL in the shallow interval at 200 μ g/kg while the baseline value is 100 μ g/kg. Fluorene was also found in both the shallow and deep intervals at SD-5 at 1,700 μ g/kg and 13,000 μ g/kg, respectively, while the baseline value is 125 μ g/kg. Dibenzo(a,h)anthracene was detected at 1,500 μ g/kg at SD-5D and was estimated above the MDL at 500 μ g/kg at SD-5S while the baseline value is 125 μ g/kg.

Metals

Several metals were detected above the RL in both the shallow and deeper sediments (Table 4-11). Arsenic, chromium, copper, lead, mercury, and zinc exceeded the Portland Harbor Apparent Baseline Values (Table 4-15) in at least one location. The upstream location, SD-6, reported metal concentrations consistent with the baseline values, except that mercury was reported at 0.14 mg/kg in SD-6D which is slightly above the baseline value of 0.1 mg/kg.

SD-1, which is located in the seep near the Mark Even dock, was the only sediment location to report chromium above the baseline value at 43.4 mg/kg. Copper, lead, and zinc were also detected above their baseline values at SD-1 at 104 mg/kg, 33.7 mg/kg, and 196 mg/kg, respectively. Note that the seep was found to have several pieces of metal debris during sampling, including a rusted steel cable and electrical wire.

SD-2S, which is near Mark Even Construction, did not report any metal above its baseline value.

SD-3S, which is adjacent to the central dock, reported arsenic, copper, and zinc at 11.1 mg/kg, 98.5 mg/kg, and 273 mg/kg, respectively. Each of these values is within approximately twice the baseline values.

No metals in either the shallow or deep intervals at location SD-4 exceed the baseline values with the exception of zinc at SD-4S, which was reported at 120 mg/kg while the baseline value is 118 mg/kg.

Several metals exceed their baseline values in both the shallow and deep intervals at SD-5, including lead, mercury, and zinc. However, the concentrations reported for mercury and zinc in both intervals and lead in the deep interval are within twice the baseline value. Arsenic was also detected above its baseline value of 5 mg/kg in the shallow interval at SD-5 at 5.8 mg/kg.

PCB/TBT

TBT was detected above the RL or estimated above the MDL in all sediment samples except the deep interval at the upstream location, SD-6 (Table 4-12). The sum of all butyltin analogs, including the tetra-n-butyltin, tri-n-butyltin, di-n-butyltin, and (mono-)n-butyltin, was estimated at concentrations ranging from 1 μg/kg at SD-5D to 142 μg/kg at SD-3S. The shallow interval at the upstream location SD-6 reported 35 μg/kg and the shallow intervals exceeding this value are SD-3S at 142 μg/kg, SD-4S at 91 μg/kg, and SD-5S at 57.5 μg/kg. However, each of these concentrations is an estimated value above the MDL. The deep intervals at SD-4 and SD-5 report total TBT (2.6 μg/kg and 1 μg/kg, respectively) less than the value at SD-6S. While no risk-based criteria is available for TBT, the USEPA reported a maximum baseline value of 300 μg/kg in sediment in Portland Harbor (USEPA 1998) for which no sediment sample in the Willamette River adjacent to the Marine Finance site exceeded.

Aroclor 1260 was the only PCB species detected above the RL in any sediment samples (Table 4-13), although no concentration exceeded the Portland Harbor Apparent Baseline Value of 180 μ g/kg (Table 4-15). The seep and the deep interval of the upstream location, SD-6, failed to detect any PCB above the RL while all other locations did detect PCB. PCB ranged from an estimated concentration of 8 μ g/kg in the shallow interval of the upstream location to 76 μ g/kg in the deep interval at SD-5D.

Total Organic Carbon

Total Organic Carbon (TOC) concentrations are reported in Table 4-14. TOC ranges from 1.51 percent (%) to 2.79% in the shallow interval and 0.92% to 4.37% in the deep interval. The Portland Harbor Apparent Baseline Value for TOC is 2%, so all sediment exceeds this value except SD-1, SD-4S, and SD-6D.

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5.0 SUMMARY

The following briefly summarizes the contaminants by media that exceed the relevant criteria as discussed in more detail in Section 4.0.

Surface Soil

TPH was detected above the RL in seven of the eight locations up to a concentration of 11,200 mg/kg. No VOC was detected above the PRGs. Only benzo(a)pyrene was reported above the PRG at one location, SS-7. HPAH at location SS-7 was reported at 4,346 μg/kg, which exceeded the Portland Harbor Apparent Baseline Value for sediment of 2,400 μg/kg although no criteria is available for surface soil. Arsenic, chromium, copper, iron, and lead exceeded the presumed background concentration at several locations in the surface soil. Two composite samples were collected near the former scrap metal storage area. Lead was detected above the background value at both of these locations and chromium and copper were detected above the background value at one of the locations. Arsenic, iron, and manganese was found above the background if the results were multiplied by 4 to represent the presumed highest concentration at any single location from which the 4 aliquots were collected for the composite samples. All TBT results were less than the Portland Harbor Apparent Baseline Value for sediment, although no TBT criteria is available for surface soil.

Subsurface Soil

TPH was detected above the RL at two locations near former USTs ranging up to 1,590 mg/kg. No VOC was detected above the RL and only pyrene was reported above the RL at one location, but the result was less than the PRG. Only lead was detected at one location at a concentration of 19 mg/kg above the background value of 17 mg/kg.

Groundwater

TPH was not detected in any sample above the RL. The only VOCs detected above the RL were chloroform and carbon disulfide, but each was less than its PRG. SVOCs were detected above the RL at 2 of the 7 locations, but only benzo(a)pyrene, chrysene, and indeno(1,2,3-cd)pyrene at GW-4 exceeded the PRG for tap water. Phenanthrene was detected above the RL but no PRG for tap water is available, although the result did exceed the ODEQ Ecological Risk Assessment Level II Screening Value. Antimony, arsenic, iron, lead, and manganese were reported above the PRGs for tap water at most locations. GW-5 and GW-6 are downgradient of the former scrap metal storage yard and the groundwater at these locations reported some of the highest arsenic, iron, lead, and manganese concentrations at the site.

Surface Water

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No VOCs or SVOCs were reported above the RL in surface water from the standpipe or the seep. No metals were reported above the PRGs for tap water.

Sediment

TPH was reported above the RL in 6 of the 7 locations sampled. The highest TPH concentration was reported in SB-5 located immediately downstream of Hendren Towboat. A sheen was noted on the sediment from SB-5 during sample collection. SVOCs, predominantly PAH compounds, were also reported in the highest concentrations at SB-5. Portland Harbor Apparent Baseline Values for LPAH and HPAH were exceeded in both the shallow and deep intervals at locations SB-4 and SB-5, which are both downstream and adjacent to the Hendren Towboat docks. Several individual SVOCs also exceeded their baseline values at SB-4 and SB-5. The metal concentrations in the upstream sediment location at SD-6 were consistent with baseline values, but arsenic, chromium, copper, lead, mercury, and zinc exceeded their baseline values in at least one location. No TBT concentrations exceeded the available baseline value and no PCB concentrations exceeded the Portland Harbor Apparent Baseline Value.

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Table 3-2
Sediment Recovery from Gravity Core Sample Collection
Marine Finance Site, Expanded Preliminary Assessment, ODEQ

Location	Recovery (percent recovery from 30 – 90 cm bgs) ¹
SD-2D	0^2
SD-3D	0^2
SD-4D	40
SD-5D	40
SD-6D	60

bgs - below ground surface

cm - centimeter

1 – approximately the top 30 cm of the aliquot in the liner was assumed to be from the 0 – 30cm interval and not included in the sample aliquot and is not included in the percent recovery.

2 - no recovery was obtained after at least 8 attempts so the location was abandoned.

Table 4-1

Total Petroleum Hydrocarbon Hits - Soils

Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SB-1	SB-2	SB-3	SB-4	SB-5	SS-1	SS-2
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Gasoline Range Organics	NA	NA		NA	NA	NA	NA
Diesel Range Organics		27		490	91	35	84
Residual Range Organics				1,100	260	,	250

Location	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Gasoline Range Organics	NA	NA	NA	NA	· NA	NA
Diesel Range Organics	230	220	28	1,400	62	
Residual Range Organics	260	110	110	9,800	380	

NA - Not applicable/not analyzed.

A blank indicates that the analysis was performed but no results were above the reporting limit.

mg/kg - milligrams per kilogram

Loc	ation	SB-1	SB-2	SB-3	SB-5	SS-1	SS-2
	Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Dichlorodifluoromethane							
Chloromethane							
Vinyl Chloride		·					
Bromomethane	-				i		
Chloroethane							
Trichlorofluoromethane							
Acetone	.						· .
1,1-Dichloroethene							
Carbon Disulfide							
Methylene Chloride			· · · · ·		<u> </u>	• • • • • • • • • • • • • • • • • • • •	
trans-1,2-Dichloroethene					į		
1,1-Dichloroethane							
2-Butanone (MEK)							······
2,2-Dichloropropane		,					***************************************
cis-1,2-Dichloroethene							
Chloroform							
Bromochloromethane							
1,1,1-Trichloroethane (TCA)							
1,1-Dichloropropene							
Carbon Tetrachloride							
1,2-Dichloroethane (EDC)							
Benzene				,		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
Trichloroethene (TCE)							
1,2-Dichloropropane							
Bromodichloromethane						·	
Dibromomethane							
2-Hexanone							T 1981 1881 1881 1881 1881
cis-1,3-Dichloropropene				,	i		
Foluene					1		
rans-1,3-Dichloropropene							
1,1,2-Trichloroethane					j		
1-Methyl-2-pentanone (MIBK)					···		
1,3-Dichloropropane							

Table 4-2

Volatile Organic Compound Hits - Soils

Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Loc	ation	SB-1	SB-2	\$B-3	SB-5	SS-1	SS-2
	Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
				· · · · · · · · · · · · · · · · · · ·	,		
Tetrachloroethene (PCE)						·	
Dibromochloromethane							
1,2-Dibromometnane (EDB)						!	
Chlorobenzene							
1,1,1,2-Tetrachloroethane						<u></u>	
Ethylbenzene							
m,p-Xylenes						í	
o-Xylene					`	į	
Styrene						!	
Bromoform							
Isopropylbenzene							
1,1,2,2-Tetrachloroethane						·	
1,2,3-Trichloropropane							
Bromobenzene						·}	
n-Propylbenzene						[
2-Chlorotoluene						!	
4-Chlorotoluene							**************************************
1,2,3-Trimethylbenzene							
tert-Butylbenzene							
1,2,4-Trimethylbenzene							
sec-Butylbenzene						1	
1,3-Dichlorobenzene						i	
4-Isopropyltoluene							
1,4-Dichlorobenzene				<u></u>		j	
n-Butylbenzene				——————————————————————————————————————		 	
1,2-Dichlorobenzene	-					ļ	
1,2-Dibromo-3-chloropropane							
1,2,4-Trichlorobenzene		-,			· · · · · · · · · · · · · · · · · · ·		
1,2,3-Trichlorobenzene						<u>-</u>	
Naphthalene						 	
Hexachlorobutadiene							

Location	SS-7	SS-6	SS-7	SS-8	SS-9	SS-10
Units	μg/kg-dry	μg/kg-dry	µg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Dichlorodifluoromethane	1	1 1	·		1	
Chloromethane					·	
Vinyl Chloride Bromomethane					· · · · · · · · · · · · · · · · · · ·	
Chloroethane						
			-			no sur high
Trichlorofluoromethane			no suv high		10	4650
Acetone	<u> </u>	66	VPRG			no level I st
1,1-Dichloroethene	ļ		he REDM			no RISOM
Carbon Disulfide	· · · · · · · · · · · · · · · · · · ·		No 1200113			
Methylene Chloride						
trans-1,2-Dichloroethene						
1,1-Dichloroethane						
2-Butanone (MEK)						
2,2-Dichloropropane						
cis-1,2-Dichloroethene						
Chloroform		"				
Bromochloromethane						
1,1,1-Trichloroethane (TCA)						
1,1-Dichloropropene				 i.		
Carbon Tetrachloride						· · · · · · ·
1,2-Dichloroethane (EDC)						
Benzene						
Trichloroethene (TCE)					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
1,2-Dichloropropane						
Bromodichloromethane						
Dibromomethane	<u> </u>					
2-Hexanone			 			
cis-1,3-Dichloropropene	-		 			
Toluene			-			
trans-1,3-Dichloropropene						
1,1,2-Trichloroethane						
4-Methyl-2-pentanone (MIBK)						ļ
						<u> </u>
1,3-Dichloropropane					1.	

Location	SS-7	SS-6	SS-7	SS-8	SS-9	SS-10
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Tetrachloroethene (PCE)				i,		
Dibromochloromethane						
1,2-Dibromometnane (EDB)	<u> </u>					l
Chlorobenzene						
1,1,1,2-Tetrachloroethane						<u> </u>
Ethylbenzene						·
m,p-Xylenes						<u> </u>
o-Xylene						
Styrene				<u> </u>		
Bromoform						
Isopropylbenzene						
1,1,2,2-Tetrachloroethane						
1,2,3-Trichloropropane						
Bromobenzene						
n-Propylbenzene						
2-Chlorotoluene						
4-Chlorotoluene						
1,2,3-Trimethylbenzene						
tert-Butylbenzene						
1,2,4-Trimethylbenzene						
sec-Butylbenzene						
1,3-Dichlorobenzene						
4-Isopropyltoluene 1,4-Dichlorobenzene						
					·····	
n-Butylbenzene						
1,2-Dichlorobenzene						
1,2-Dibromo-3-chloropropane						
1,2,4-Trichlorobenzene						
1,2,3-Trichlorobenzene						
Naphthalene					ATTENDED OF THE PARTY OF THE PA	
Hexachlorobutadiene						1

A blank indicates that the analysis was performed but no results were above the reporting limit. ug/kg - micrograms per kilogram
A complete data set is included in Appendix D.

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	Location	SB-1	SB-2	SB-3	SB-5	SS-1
	Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
N. Blisses adiasta dansina					· · · · · · · · · · · · · · · · · · ·	,
N-Nitrosodiethylamine Aniline			,			
bis(2-Chloroethyl)ether						
Phenol						
2-Chlorophenol 1,3-Dichlorobenzene					·	
····						
1,4-Dichlorobenzene						
1,2-Dichlorobenzene						
Benzyl Alcohol						
bis(2-Chloroisoproyl)ether						
2-Methylphenol						
Hexachloroethane						
N-Nitroso-di-n-propylamine						
3- and 4-Methylphenol						
Nitrobenzene						
sophorone						
2-Nitrophenol						
2,4-Dimethylphenol						
ois(2-chloroethoxy)methane						
2,4-Dichlorophenol						
Benzoic Acid						
1,2,4-Trichlorobenzene						
Naphthalene						
1-Chloroaniline						
Hexachlorobutadiene			· · · · · · · · · · · · · · · · · · ·			
1-Chloro-3-methylphenol						
2-Methylnaphthalene					<u> </u>	
lexachlorocyclopentdiene						
2,4,6-Trichlorophenol						
2,4,5-Trichlorophenol						
2-Chloronaphthalene						
2-Nitroaniline						
Acenaphthylene						
Dimethylphthalate						
2,6-Dinitrotoluene						
Acenaphthene						

Table 3-1
Subsurface Soil Sample Intervals and Groundwater Collection Depths
Marine Finance Site, Expanded Preliminary Assessment, ODEQ

Location	Soil Sample Interval (feet bgs)	Groundwater Collection Depth (feet bgs)
SB-1/GW-1	6 - 8	16 – 18
SB-2/GW-2	14 - 16	22 - 241
SB-3/GW-3	18 – 20	20 - 22
SB-4/GW-4	20 – 21	21 – 24
SB-5/GW-5	18 - 19	24 - 27 ²
GW-6	NA	22 – 24
GW-7	NA	22 - 24

bgs - below ground surface

NA – not applicable

- 1 groundwater was found at approximately 16 feet bgs, but the borehole was advanced to improve water recovery.
- 2 groundwater was found at approximately 20 feet bgs, but the borehole was advanced to improve water recovery.

Locat	ion	SB-1	SB-2	SB-3	SB-5	SS-1
Ur	nits	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
3-Nitroaniline	<u> </u>				<u> </u>	
2,4-Dinitrophenol						
Dibenzofuran						
4-Nitrophenol						<u> </u>
2,4-Dinitrotoluene						
Fluorene						
4-Chlorophenylphenyl ether	_					
Diethylphthalate						
4-Nitroaniline		i	 			
2-Methyl-4,6-Dinitrophenol					 	
N-Nitrosodiphenylamine						
4-Bromophenylphenyl ether						
Hexachlorobenzene						
Pentachlorophenol						
Phenanthrene	_					
Anthrecene			-			
Di-n-butylphthalate						
Fluoranthene					 	
Pyrene		0.36	BELV HER			
Butylbenzylphthalate			V industrial	600		
3,3'-Dichlorobenzidine			LRBOM			
Benzo(a)anthracene						
Chrysene	_					
bis(2-Ethylhexyl)phthalate						
Di-n-octylphthalate						
Benzo(b)fluoranthene						
Benzo(k)fluoranthene				_		
Benzo(a)pyrene						
ndeno(1,2,3-cd)pyrene						******
Dibenzo(a,h)anthracene			-			
Benzo(g,h,i)perylene						
LPAH		0.00	0.00	0.00	0.00	0.00
HPAH	1	0.36	0.00	0.00	0.00	0.00

Location	SS-2	SS-3	SS-5	SS-6	SS-7
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Nitrosodiethylamine					
niline					NA NA
s(2-Chloroethyl)ether					NA_
henol		· · · · · · · · · · · · · · · · · · ·			
-Chlorophenol					
,3-Dichlorobenzene					
4-Dichlorobenzene					
,2-Dichlorobenzene					
enzyl Alcohol					
is(2-Chloroisoproyl)ether					
2-Methylphenoi					
lexachloroethane					
-Nitroso-di-n-propylamine	-				
- and 4-Methylphenol					
litrobenzene				- AN IN	
ophorone	H - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		· · · · · · · · · · · · · · · · · · ·		
Nitrophenol					
4-Dimethylphenol					
s(2-chloroethoxy)methane	· · · · · · · · · · · · · · · · · · ·				· · · · · · · · · · · · · · · · · · ·
4-Dichlorophenol					-····
nzoic Acid					
2,4-Trichlorobenzene					
aphthalene					
Chloroaniline					3_J
exachlorobutadiene					
Chloro-3-methylphenol					
-Methylnaphthalene				——————————————————————————————————————	
exachlorocyclopentdiene					3 J
,4,6-Trichlorophenol					
4,5-Trichlorophenol					
Chloronaphthalene					· · · · · · · · · · · · · · · · · · ·
Nitroaniline			<u> </u>		
cenaphthylene					3 J
methylphthalate					
6-Dinitrotoluene			· · · · · · · · · · · · · · · · · · ·		0 <u>.7</u> J
cenaphthene					110

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10/26/00 - 4:04 PM

Table 4-3
Semi-Volatile Organic Compound Hits - Soils
Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SS-2	\$S-3	SS-5	SS-6	SS-7	
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	
3-Nitroaniline				T	·	
2,4-Dinitrophenol						
Dibenzofuran					² 18	nocoom
4-Nitrophenol					10	be LV High
2,4-Dinitrotoluene						
Fluorene					44	LROOM
4-Chlorophenylphenyl ether	,					V SLUNISh
Diethylphthalate					1 J	1
4-Nitroaniline						reversom neversom
2-Methyl-4,6-Dinitrophenol						Viewel #
N-Nitrosodiphenylamine						
4-Bromophenylphenyl ether						1
Hexachlorobenzene						1
Pentachlorophenol						
Phenanthrene	0.67				490 J	1660W an
Anthrecene					100 J	
Di-n-butylphthalate					3 J	UP BOM SI Vleves #, 52 NO VEROWN,
Fluoranthene	1.4				840 J	Je80m, 55%
Pyrene				0.65	830 J	recon st
Butylbenzylphthalate	·				5.4	no lead it
3,3'-Dichlorobenzidine					490	no sev H no !
Benzo(a)anthracene	0.65			RBONNES.	(620)	LEBOWTE
Chrysene	0.89					no level \$
bis(2-Ethylhexyl)phthalate				1.6	20 J	L levelth , WSL
Di-n-octylphthalate						NO SLV 14
Benzo(b)fluoranthene	0.87				520	L'EGOM
Benzo(k)fluoranthene	0.79					1 85 6 0W
Benzo(a)pyrene	0.91				¥470 + Ø	270)
Indeno(1,2,3-cd)pyrene	0.68				1390	Born (270)
Dibenzo(a,h)anthracene					66	i sev nigh
Benzo(g,h,i)perylene	0.78				290	DSLUNG
LPAH	0.67	0.00	0.00	0.00	653	
НРАН	6.97	0.00	0.00	0.65	4,346	

[#] above occ RBDM of 270 pph

thouse sw High of 100 pph(5x conversion from measured "low" to estimated thigh"

NOAEL to chrome LOAEL (USEPA, 1997 PS)

² above 080 SCV of 2 ppb for nowmals

· · · · · · · · · · · · · · · · · · ·	Location	SS-8	SS-9	SS-10	SS-11
-, · · · · · · · · · · · · · · · · · · ·	Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
N-Nitrosodiethylamine			1	· · · · · · · · · · · · · · · · · · ·	<u> </u>
Aniline					
bis(2-Chloroethyl)ether Phenol					
2-Chlorophenol					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					
1,2-Dichlorobenzene					<u> </u>
Benzyl Alcohol					
bis(2-Chloroisoproyl)ether					
2-Methylphenol					
Hexachloroethane					
N-Nitroso-di-n-propylamine					
3- and 4-Methylphenol			· · · · · · · · · · · · · · · · · · ·		
Nitrobenzene					1
Isophorone					
2-Nitrophenol					
2,4-Dimethylphenol					
bis(2-chloroethoxy)methane					
2,4-Dichlorophenol					
Benzoic Acid					
1,2,4-Trichlorobenzene					
Naphthalene					
4-Chloroaniline					
Hexachlorobutadiene					
4-Chloro-3-methylphenol					
2-Methylnaphthalene					
Hexachlorocyclopentdiene					
2,4,6-Trichlorophenol					
2,4,5-Trichlorophenol					
2-Chloronaphthalene					
2-Nitroaniline					
Acenaphthylene					
Dimethylphthalate					·
2,6-Dinitrotoluene					
Acenaphthene					

Locat	tion SS-8	SS-9	SS-10	SS-11 _.	
Uı	nits μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry]
3-Nitroaniline	<u> </u>				_
2,4-Dinitrophenol					
Dibenzofuran					-[
4-Nitrophenol					-
2,4-Dinitrotoluene					. -
Fluorene					
4-Chlorophenylphenyl ether				l	-
Diethylphthalate					-
4-Nitroaniline					
2-Methyl-4,6-Dinitrophenol					-
N-Nitrosodiphenylamine			·		-
4-Bromophenylphenyl ether					-
Hexachlorobenzene					1
Pentachlorophenol					-
Phenanthrene		0.52			no love to
Anthrecene					1
Di-n-butylphthalate					1
Fluoranthene	0.44	1.3		0.59	URBOM, SWH, NO WILL
Pyrene		0.90		0.47	VIEROM, SW H, relad]
Butylbenzylphthalate					-
3,3'-Dichlorobenzidine					-
Benzo(a)anthracene		0.59			TREOM, SLU 14, no love it
Chrysene		0.83		0.35	begon, sur H, notwel I
bis(2-Ethylhexyl)phthalate					1
Di-n-octylphthalate					1
Benzo(b)fluoranthene		1.1		0.34	URBOM, SUV It, no level
Benzo(k)fluoranthene		0.92			URBOMISCULT, No love I
Benzo(a)pyrene		0.79			JRBDM, SLV 1+, Tever I
Indeno(1,2,3-cd)pyrene		0.64	į		narebon, swit, no led
Dibenzo(a,h)anthracene					
Benzo(g,h,i)perylene		0.54			no herel III, no 128 DM.
LPAH	0.00	0.52	, 0.00	0.00	V SLU Migh
НРАН	0.44	7.61	0.00	1.75	-

A blank indicates that the analysis was performed but no results were above the reporting limit, ug/kg - micrograms per kilogram

LPAH (low molecular weight polynuclear aromatic hydrocarbon) includes acenaphthene, acenaphthylene, fluorene, 2-methylnaphthalene, naphthalene, and phenanthrene.

HPAH (high molecular weight polynuclear aromatic hydrocarbons) includes anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, and pyrene.

J - Analyte positively identified; value reported is greater than method detection limit, but below method reporting limit.

A complete data set is included in Appendix D.

Table 4-4
Metal Hits - Soils
Marine Finance Site - Expanded Preliminary Assessment, ODEQ

	Location	SB-1	SB-2	SB-5	SS-1	SS-2	SS-3	\$S-4	SS-5	5 CV 14	Level II
	Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry		
Bollad !	DR(0										
Aluminum 5) 300	100,000	12,500	9,470	10,300	8,690	9,090	11,000	13,400	8,640		50
· / / /	410'				6.1 B	8 <u>.</u> 1 B	5.7 B	7.6 B		ે હવ	5
Arsenic ()	1.6	3.1	3.2	3.3	3.3	(7.3.)	3.8	5.0	4.1	33	10
Barium (07,000	111	74.6	86.6	99.7	1-1-5	131	129	72.8	60	25
Beryllium (9000	0.3 B	0.4 B	0.3 В	0.2 B]	(0				
Cadmium L	450					0.1 B				5	4
Calcium		4,420	3,890	4,100	5,100	5,160	4,890	5,710	6,030		
Chromium 27	450	15.6	11.7	13.6	15.4	29.7	13.4	43.5	8 1.3)	111	0.4
Cobalt \	960	13.4	12.8	12.6	10.0	14.8	11.6	11.0	8.1	250	عو
ا	11,000	15.7	13.1	20.1	26.4	45.5	28.8	42.1	(52.6)	149	50
	00000	24,200	22,100	22,900	24,300	39,100	35,800	33,800	25,800		10
Lead 17	150	12.7 B	3.0 B	19.0 B	31.3	90.7	(47.9)	(51.7)	(35.1 ·)	130	16
Magnesium		4,370	3,500	3,460	3,730	2,580	3,220	6,650	2,880		****
/ Manganese ⅓00 ∖	1,000	316	273	386	459	621	547	507	708	1100	100
Mercury ou	62	0.11		0.10	0.03	0.03	0.03	0.04	0.03	١	0,1
Nickel 1	10,000	20.0	16.4	17.1	12.3	17.8	14.6	(27.5)	(31.6)	પ૧	3 0
Potassium		522	521	565	677	576	880	805	621		
Selenium •	5100	1.1 B		1.2 B		1.0 B				5	1
Silver	5100										,
Sốdium		437	293	304	268	263	320	583	377		٠
Thallium	67										1
Vanadium 7	700	65.2	56.5	60.4	70.6	96.7	92.0	79.6	63.6	-	<i>à</i>
Zinc GG W	6,000	56.5	46.5	80.1	76.6	(194)	98.5	(184)	82.3	459	50

Table 4-4
Metal Hits - Soils
Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SS-6	SS-7	SS-8	SS-9	SS-10	SS-11
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Aluminum	11,000	NA	5,280	9,890	10,500	10,900
Antimony	7.6 B	0.31	9.6 B	7.4 B		7.6
Arsenic	8.9	/12.1)	0.9 B	(13.3)	2.9	7.6
Barium	131	NA	43.9	137	112.0	113
Beryllium	0.3 B	0.23	0.1 B	0.2 B	0.3 B	0.3
Cadmium		0.16				0.5 E
Calcium	4,580	NA_	4,150	15,200	4,460	5,120
Chromium	17.0	/33.3	8.2	28.0	11.6	22.7
Cobalt	9.7	NA .	16.3	11.1	15.5	11.7
Copper	46.0	24.2	12.8	270	19.2	48.2
Iron	30,300	NA	(38,700)	36,200	22,600	29,200
Lead	₹37.8 \	21.2	11.3 B	56.0	15.5	70.5
Magnesium	3,280	NA	1,470	3,810	3,560	3,080
Manganese	425	NA	470	543	481	430
Mercury	0.02	0.02 B		0.04	0.03	(0.09)
Nickel	15.0	18.5	7.7	16.9	13.8	31.8
Potassium	781	NA	545	856	563	716
Selenium					0.9 B	
Silver		0.03				
Sodium	376	ΝΆ	282	456	316.0	506
Thallium		0.07				
Vanadium	82.7	NA	134	68.0	80.4	91.9
Zinc	172	81.5	60.6	458	66.0	219

B = Element was positively identified and quantitated above the instrument reporting limit, but less than the required reporting limit?

NA - Not analyzed for using ultra-trace ICP/MS analytical method.

mg/kg - milligrams per kilogram

A blank indicates that the analysis was performed but no results were above the reporting limit.

A complete data set is included in Appendix D.

Table 4-5 Tri-Butyltin Hits - Soils Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SB-5	SS-1	SS-2	SS-7	SS-9	SS-10
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Tetra-n-butyltin						
Tri-n-butyltin Cation		,8	120	0.5 J	١10	2
Di-n-butyltin Cation	8	2	15	0.4 J	29	· 0.5 J
n-butyltin Cation	2	3	12		27	
Total butyltins	10	13	147	0.9 J	166	2.5 J

J - Analyte positively identified; value reported is greater than method detection limit, but below method reporting limit. ug/kg - micrograms per kilogram

A blank indicates that the analysis was performed but no results were above the reporting limit.

Tri-n-butyltin, di-n-butyltin, and n-butyltin exist as cations in solution upon extraction from the soil.

Total buyltin is the sum of concentrations for tetra-n-butyltin and the tri-, di-, and mono- n-butyltin cations.

	ocation	GW-1	GW-2	GW-3	GW-4	GW-5
V-1	Units	μg/L	μg/L	μg/L	μg/L	μg/L
Dichlorodifluoromethane						
Chloromethane						
Vinyl Chloride						
Bromomethane						
Chloroethane						
Trichlorofluoromethane						
Acetone						
1,1-Dichloroethene			*			
Carbon Disulfide			 			
Methylene Chloride						
trans-1,2-Dichloroethene						
1,1-Dichloroethane						
2-Butanone (MEK)						
2,2-Dichloropropane						
cis-1,2-Dichloroethene						
Chloroform						
Bromochloromethane			0.75			
1,1,1-Trichloroethane (TCA)						
1,1-Dichloropropene	-					
Carbon Tetrachloride				· · · · · · · · · · · · · · · · · · ·		
1,2-Dichloroethane (EDC)						
Benzene		· · · · · · · · · · · · · · · · · · ·		ļ		
Trichloroethene (TCE)						
1,2-Dichloropropane						
Bromodichloromethane						
Dibromomethane					-	
2-Hexanone						
cis-1,3-Dichloropropene			 			
Toluene						
				<u> </u>		
trans-1,3-Dichloropropene			· · · · · · · · · · · · · · · · · · ·			
1,1,2-Trichloroethane	-		_			
4-Methyl-2-pentanone (MIBK)						

Location	GW-1	GW-2	GW-3	GW-4	GW-5
Units	μg/L	μg/L	μg/L	μg/L	μg/L
Tetrachioroethene (PCE)					
Dibromochloromethane				,	
1,2-Dibromometnane (EDB)					
Chlorobenzene					
1,1,1,2-Tetrachioroethane					
Ethylbenzene					
m,p-Xylenes					
o-Xylene					
Styrene					
Bromoform					
Isopropylbenzene					
1,1,2,2-Tetrachloroethane					
1,2,3-Trichloropropane					
Bromobenzene					
n-Propylbenzene					
2-Chlorotoluene					
4-Chlorotoluene					
1,2,3-Trimethylbenzene					
tert-Butylbenzene					
1,2,4-Trimethylbenzene					
sec-Butylbenzene					
1,3-Dichlorobenzene			1		
4-isopropyltoluene		 			
1,4-Dichlorobenzene		<u> </u>			
n-Butylbenzene			-		
1,2-Dichlorobenzene					
1,2-Dibromo-3-chloropropane		 			
1,2,4-Trichlorobenzene	· · · · · · · · · · · · · · · · · · ·				
1,2,3-Trichlorobenzene		 -	-		
Naphthalene	<u> </u>				
Hexachlorobutadiene					

Location	GW-6	GW-7	SW-1	SW-2
Units	μg/L	μg/L	μg/L	μg/L
	1			
Dichlorodifluoromethane				
Chloromethane				
Vinyl Chloride			*.	
Bromomethane				
Chloroethane				
Trichlorofluoromethane				
Acetone				
1,1-Dichloroethene				
Carbon Disulfide	0.78	0.53		
Methylene Chloride				
trans-1,2-Dichloroethene				
1,1-Dichloroethane				
2-Butanone (MEK)				
2,2-Dichloropropane				
cis-1,2-Dichloroethene				
Chloroform				
Bromochloromethane				
1,1,1-Trichloroethane (TCA)				
1,1-Dichloropropene				ſ
Carbon Tetrachloride				
1,2-Dichloroethane (EDC)				
Benzene				
Trichloroethene (TCE)				· · · · ·
1,2-Dichloropropane				
Bromodichloromethane				· · · · · · · · · · · · · · · · · · ·
Dibromomethane				
2-Hexanone			· · · · · · · · · · · · · · · · · · ·	
cis-1,3-Dichloropropene				
Toluene				
trans-1,3-Dichloropropene				
1,1,2-Trichloroethane				
4-Methyl-2-pentanone (MiBK)				
1,3-Dichloropropane				

Location	GW-6	GW-7	SW-1	SW-2
Units	μg/L	μg/L	μg/L	μg/L
Tetrachloroethene (PCE)				
Dibromochloromethane				
1,2-Dibromometnane (EDB)				
Chlorobenzene				
1,1,1,2-Tetrachioroethane				
Ethylbenzene				
m,p-Xylenes				
o-Xylene			T	
Styrene				
Bromoform				
Isopropylbenzene				
1,1,2,2-Tetrachloroethane				
1,2,3-Trichloropropane				-
Bromobenzene			1	
n-Propylbenzene			l	
2-Chlorotoluene				
4-Chlorotoluene		<u> </u>		
1,2,3-Trimethylbenzene		<u> </u>	1	
tert-Butylbenzene				
1,2,4-Trimethylbenzene				
sec-Butylbenzene			1	
1,3-Dichlorobenzene				
4-isopropyitoluene			1	
1,4-Dichlorobenzene			1	
n-Butylbenzene				
1,2-Dichlorobenzene			l	
1,2-Dibromo-3-chloropropane				
1,2,4-Trichlorobenzene			 	
1,2,3-Trichtorobenzene				
Naphthalene			- 	
Hexachlorobutadiene		 	1	

A blank indicates that the analysis was performed but no results were above the reporting limit, ug/L - micrograms per liter

Location	GW-1	GW-2	GW-3	GW-4
Units	μg/L	μg/L	μg/L	μg/L
M Nitropadiathylamina	<u> </u>			
N-Nitrosodiethylamine Aniline				
bis(2-Chloroethyl)ether				
Phenol				-
2-Chlorophenol 1,3-Dichlorobenzene				
	···		· · · · · · · · · · · · · · · · · · ·	·
1,4-Dichlorobenzene				
1,2-Dichlorobenzene				
Benzyl Alcohol				
bis(2-Chloroisoproyl)ether				
2-Methylphenol				· · · · · · · · · · · · · · · · · · ·
Hexachloroethane				
N-Nitroso-di-n-propylamine	-			
3- and 4-Methylphenol				
Nitrobenzene				
Isophorone				
2-Nitrophenol				
2,4-Dimethylphenol				
bis(2-chloroethoxy)methane				
2,4-Dichlorophenol				<u> </u>
Benzoic Acid				
1,2,4-Trichlorobenzene				
Naphthalene				
4-Chloroaniline				
Hexachlorobutadiene				
4-Chloro-3-methylphenol				-
2-Methylnaphthalene				
Hexachlorocyclopentdiene				
2,4,6-Trichlorophenol				,
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Acenaphthylene				
Dimethylphthalate				
2,6-Dinitrotoluene		 		
Acenaphthene		 		

Location	GW-1	GW-2	GW-3	GW-4
Units	μg/L	μg/L	μg/L	μg/L
3-Nitroaniline				. "3'55.
2,4-Dinitrophenol				
Dibenzofuran				
4-Nitrophenol				·
2,4-Dinitrotoluene				
Fluorene				
4-Chlorophenylphenyl ether				
Diethylphthalate				
4-Nitroaniline				
2-Methyl-4,6-Dinitrophenol				
N-Nitrosodiphenylamine				
4-Bromophenylphenyl ether				
Hexachlorobenzene				
Pentachlorophenol	ī			
Phenanthrene				18
Anthrecene				
Di-n-butylphthalate				
Fluoranthene				27
Pyrene				26
Butylbenzylphthalate				
3,3'-Dichlorobenzidine				
Benz(a)anthracene				
Chrysene				9.9
bis(2-Ethylhexyl)phthalate				
Di-n-octylphthalate				
Benzo(b)fluoranthene				
Benzo(k)fluoranthene				
Benzo(a)pyrene				13
Indeno(1,2,3-cd)pyrene				. 11
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				14

Location	GW-5	GW-6	GW-7	SW-1	SW-2
Units	μg/L	μg/L	μg/L	μg/L	μg/L
N-Nitrosodiethylamine					
Aniline		'			
bis(2-Chloroethyl)ether		_			
Phenol					
2-Chlorophenol					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					
1,2-Dichlorobenzene					
Benzyl Alcohol					
ois(2-Chloroisoproyl)ether					
2-Methylphenol					
Hexachloroethane					
N-Nitroso-di-n-propylamine					
3- and 4-Methylphenol					J
Nitrobenzene					
sophorone					
2-Nitrophenol					
2,4-Dimethylphenol					
bis(2-chloroethoxy)methane					
2,4-Dichlorophenol					
Benzoic Acid					
1,2,4-Trichlorobenzene					
Naphthalene					
4-Chloroaniline					
4-Chloro-3-methylphenol					
2-Methylnaphthalene					
Hexachlorocyclopentdiene					
2,4,6-Trichlorophenol					
2,4,5-Trichlorophenol			<u> </u>		
2-Chloronaphthalene		 		 	
2-Nitroaniline		- 			
Acenaphthylene					******
Dimethylphthalate					
				ļ	
2,6-Dinitrotoluene				ļ	
Acenaphthene	***			1	

Location	GW-5	GW-6	GW-7	SW-1	SW-2
Units	μg/L	μg/L	μg/L	μg/L	μg/L
3-Nitroaniline					
2,4-Dinitrophenol					
Dibenzofuran					
4-Nitrophenol	```				
2,4-Dinitrotoluene					
Fluorene					
4-Chlorophenylphenyl ether	`				
Diethylphthalate	,				
4-Nitroaniline	······································				
2-Methyl-4,6-Dinitrophenol				٧	
N-Nitrosodiphenylamine					
4-Bromophenylphenyl ether					
Hexachlorobenzene					
Pentachlorophenol				-	
Phenanthrene					777
Anthrecene					
Di-n-butylphthalate					
Fluoranthene	13				
Pyrene	14				
Butylbenzylphthalate					
3,3'-Dichlorobenzidine					
Benz(a)anthracene					
Chrysene					
bis(2-Ethylhexyl)phthalate					
Di-n-octylphthalate					
Benzo(b)fluoranthene					
Benzo(k)fluoranthene					
Benzo(a)pyrene					
Indeno(1,2,3-cd)pyrene					
Dibenz(a,h)anthracene					
Benzo(g,h,i)perylene					

A blank indicates that the analysis was performed but no results were above the reporting limit. ug/L - micrograms per liter

Table 4-8

Metal Hits - Water

Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	GW-1	GW-2	GW-5	GW-6	GW-7	SW-1	SW-2
Units	μg/L						
Aluminum	33,200	13,700	13,300	10,400	9,840	42.2 B	
Antimony	34.8 B		25.6 B	. ,			
Arsenic	9.3	5.5	36.9	3.7 B	5.2		
Barium	305	152	182	179	103	19.4	5.2
Beryllium	1.0 B	0.4 B	0.2 B	0.9 B			
Cadmium							
Calcium	39,100	29,400	47,200	30,000	29,000	14,700	14,700
Chromium	39.3	29.8	22.5	15.6	29.4		
Cobalt	37.1	9.9 B	14.7	16.6	9.2 B		
Copper	47.0	18.8	95.4	24.6	20.1		
Iron	54,900	29,700	89,300	46,100	36,700	98	21
Lead	47.5	12.5	117	25.6	11.6		
Magnesium	23,300	16,400	15,700	15,800	14,900	4,640	4,640
Manganese	773	682	3,160	1,500	1,630	16	4 B
Mercury		·					
Nickel	51.0	20.5	19.3 B	21.3	26.2		
Potassium	3,700	3,080	3,320	2,310	2,600		
Selenium							
Silver							
Sodium	10,300	9,510	10,100	12,200	9,310	7,450	
Thallium							
Vanadium	146	75.5	56.0	53.3	44.8	4.9 B	
Zinc	184	76.2	227	99.9	63.3	4.4 B	

B = Element was positively identified and quantitated above the instrument reporting limit, but less than the required reporting limit.

A blank indicates that the analysis was performed but no results were above the reporting limit.

ug/L - micrograms per liter

A complete data set is included in Appendix D.

Table 4-9

Total Petroleum Hydrocarbon Hits - Sediments

Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SD-1	SD-2S	SD-3S	SD-4S	SD-4D
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
		,			
Gasoline Range Organics	NA	NA	NA	NA	NA
Diesel Range Organics	92		99	210	570
Residual Range Organics	640			410	730
Location	SD-5S	SD-5D	SD-6S	SD-6D	
Location Units	SD-5S mg/kg-dry	SD-5D mg/kg-dry	SD-6S mg/kg-dry	SD-6D mg/kg-dry	
Units					
	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	

NA - Not applicable/not analyzed

mg/kg - milligrams per kilogram

A blank indicates that the analysis was performed but no results were above the reporting limit.

Location	SD-1	SD-2S	SD-3S	SD-4S
Units	μg/kg	μg/kg	μg/kg	μg/kg
		· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·
N-Nitrosodiethylamine				
Aniline				
bis(2-Chloroethyl)ether				
Phenol	6J		7 J	
2-Chlorophenol				
1,3-Dichlorobenzene				+ F ₆
1,4-Dichlorobenzene				
1,2-Dichlorobenzene				
Benzyl Alcohol				
bis(2-Chloroisoproyl)ether				
2-Methylphenol				
Hexachloroethane				
N-Nitroso-di-n-propylamine		3 J		
3- and 4-Methylphenol				
Nitrobenzene				
sophorone				
2-Nitrophenol				
2,4-Dimethylphenol				
pis(2-chloroethoxy)methane				
2,4-Dichlorophenol				
Benzoic Acid	50 J	80 J	50 J	
1,2,4-Trichlorobenzene				· · · · · · · · · · · · · · · · · · ·
Naphthalene	4 J	29 J	18 J	28 J
1-Chloroaniline				
-lexachlorobutadiene				
1-Chloro-3-methylphenol				
2-Methylnaphthalene	2 J	8 J	11.0	6.9
lexachlorocyclopentdiene				0,3
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene			<u> </u>	
2-Nitroaniline				
Acenaphthylene	6 J	40.1		
Dimethylphthalate		40 J	33 J	56 J
2,6-Dinitrotoluene	1 J	1 J		
Acenaphthene	29	50	94	 40

Table 4-10
Semi-Volatile Organic Compound Hits - Sediment
Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SD-1	SD-2S	SD-3S	SD-4S
Units	μg/kg	μg/kg	μg/kg	μg/kg
3-Nitroaniline		<u> </u>		
2,4-Dinitrophenol		,		
Dibenzofuran	7 J	23	25	14
4-Nitrophenol				·····
2,4-Dinitrotoluene				
Fluorene	16	46	55	61
4-Chlorophenylphenyl ether				
Diethylphthalate	3 J	4 J	3 J	2.4
4-Nitroaniline				
2-Methyl-4,6-Dinitrophenol				— ·
N-Nitrosodiphenylamine				
4-Bromophenylphenyl ether				·
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene	130 J	120 J	180 J	2,000
Anthrecene	29 J	38 J	53 J	56 J
Di-n-butylphthalate				
Fluoranthene	230 J	180 J	250 J	4,100
Pyrene	220 J	200 J	260 J	4,100
Butylbenzylphthalate		6 J	3 J	
3,3'-Dichlorobenzidine				
Benzo(a)anthracene	120	93	110	2,100
Chrysene	140	120	130	2,300
bis(2-Ethylhexyl)phthalate	50 J	90 J	270	20 J
Di-n-octylphthalate				
Benzo(b)fluoranthene	170 J	110 J	120 J	2,200
Benzo(k)fluoranthene	55	38	41	42
Benzo(a)pyrene	120	100	110	2,000
Indeno(1,2,3-cd)pyrene	58	63	100	1,600
Dibenzo(a,h)anthracene	10 J	10 J	· 20 J	19
Benzo(g,h,i)perylene	44	56	99	1,700
LPAH	187 J	293 J	391 J	2,192 J
НРАН	1,196 J	1,008 J	1,293 J	20,217 J

Location	SD-4D	SD-5S	SD-5D	SD-6S	SD-6D
Units	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg
		· · · · · · · · · · · · · · · · · · ·	· ·		
N-Nitrosodiethylamine			·		
Aniline					·
bis(2-Chloroethyl)ether				<u>_</u>	
Phenol			***	6 J	
2-Chlorophenol					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene		<i>:</i>			
1,2-Dichlorobenzene				·	
Benzyl Alcohol					
bis(2-Chloroisoproyl)ether					
2-Methylphenol					
Hexachloroethane					
N-Nitroso-di-n-propylamine					
3- and 4-Methylphenol					
Nitrobenzene					
sophorone					
2-Nitrophenol					
2,4-Dimethylphenol					
bis(2-chloroethoxy)methane					
2,4-Dichlorophenol				·	
Benzoic Acid				80 J	
1,2,4-Trichlorobenzene					· · · · · · · · · · · · · · · · · · ·
Naphthalene	20 J	300 J	940 J	19 J	3 J
4-Chloroaniline				r · · · · · · · -	
Hexachlorobutadiene					
4-Chloro-3-methylphenol					
2-Methylnaphthalene	3.4	100 J	750	10 J	180
Hexachlorocyclopentdiene					<u>'</u>
2,4,6-Trichlorophenol					
2,4,5-Trichlorophenol					• · · · · · · · · · · · · · · · · · · ·
2-Chloronaphthalene		:			
2-Nitroaniline					
Acenaphthylene	54 J	100 J	450 J	42 J	2 J
Dimethylphthalate	040	,,,,,	430 3	72 3	
2,6-Dinitrotoluene	··				
Acenaphthene	54	1,600	14,000	83	- ·

Table 4-10
Semi-Volatile Organic Compound Hits - Sediment
Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SD-4D	SD-5S	SD-5D	SD-6S	SD-6D
Units	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg
3-Nitroaniline					
2,4-Dinitrophenol					
Dibenzofuran	4.3	200 J	1,200	6 J	
4-Nitrophenol		2000	500 J		
2,4-Dinitrotoluene			300 3		
Fluorene	74	1,700	13,000	35	2 J
4-Chlorophenylphenyl ether					2.0
Diethylphthalate				2 J	
4-Nitroaniline				······	
2-Methyl-4,6-Dinitrophenol					
N-Nitrosodiphenylamine					
4-Bromophenylphenyl ether					
Hexachlorobenzene					
Pentachlorophenol					
Phenanthrene	2,300	16,000	99,000	150 J	16 J
Anthrecene	33 J	890	20,000	46 J	3 J
Di-n-butylphthalate					
Fluoranthene	4,100	18,000	82,000	210 J	360 J
Pyrene	3,900	24,000	110,000	240 J	450 J
Butylbenzylphthalate			100 J	4 J	re ve i d'America Socie e
3,3'-Dichlorobenzidine					
Benzo(a)anthracene	1,700	6,500	22,000	100	110
Chrysene	2,100	7,800	27,000	130	140
bis(2-Ethylhexyl)phthalate	5 J	200 J	200 J	90 J	
Di-n-octylphthalate					
Benzo(b)fluoranthene	, 1,900	6,900	20,000	130 J	130 J
Benzo(k)fluoranthene	41	2,500	6,400	44	60 J
Benzo(a)pyrene	1,600	7,400	24,000	130	130
ndeno(1,2,3-cd)pyrene	68	6,100	17,000	100	100 J
Dibenzo(a,h)anthracene	12	500 J	1,500	20 J	6 J
Benzo(g,h,i)perylene	59	6,200	20,000	110	200 J
LPAH	2,505 J	19,800 J	128,140 J	339 J	23 J
HPAH	15,513 J	86,790 J	349,900	1,260 J	1,689 J

A blank indicates that the analysis was performed but no results were above the reporting limit. ug/kg - micrograms per kilogram

LPAH (low molecular weight polynuclear aromatic hydrocarbon) includes acenaphthene, acenaphthylene, fluorene, 2-methylnaphthalene, naphthalene, and phenanthrene.

HPAH (high molecular weight polynuclear aromatic hydrocarbons) includes anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, and pyrene.

A complete data set is included in Appendix D.

J - Analyte positively identified; value reported is greater than method detection limit, but below method reporting limit.

Table 4-11

Metal Hits - Sediment

Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SD-1	SD-2S	SD-3S	SD-4S	SD-4D	SD-5S	SD-5D	SD-6S	SD-6D
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Antimony	0.17	0.17	1.87	0.65	0.19	0.62	0.56	0.14	0.16
Arsenic	3.4	4.3	11.1	4.9	3.8	5.8	3.6	4.6	3.7
Beryllium	0.33	0.49	0.53	0.49	0.43	0.59	0.41	0.55	0.45
Cadmium	0.35	0.23	0.26	0.32	0.17	0.30	0.43	0.21	0.15
Chromium	43.4	27.3	27.7	25.8	24.3	33.1	23.1	27.1	22.9
Copper	104	34.6	98.5	38.5	26.3	42.4	36.5	36.2	29.4
Lead	33.7	13.6	28.0	27.8	10.9	232	46.0	14.3	15.1
Mercury ~	0.02	0.06	0.09	0.07	0.07	0.11	0.18	0.08	0.14
Nickel	13.1	22.0	23.2	27.5	22.8	26.8	25.1	21.7	20.5
Selenium									
Silver	0.08	0.30	0.35	0.35	0.22	0.35	0.49	0.32	0.25
Thallium	0.11	0.14	0.09	0.10	0.09	0.14	0.07	0.10	0.06
Zinc	196	87.8	273	120	78.8	142	121	99.3	65.1

B = Element was positively identified and quantitated above the instrument reporting limit, but less than the required reporting limit, mg/kg - milligrams per kilogram

NA - Not analyzed for using ultra-trace ICP/MS analytical method.

A blank indicates that the analysis was performed but no results were above the reporting limit.

A complete data set is included in Appendix D.

Table 4-12 Tri-butyltin Hits - Sediment Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SD-1	SD-2S	SD-3S	SD-4S	SD-4D	SD-5S	SD-5D	SD-6S	SD-6D
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Tetra-n-butyltin			1 J	1 J		0.5 J			
Tri-n-butyltin Cation	0.7 J	16	130	67	1 J	47	F F F T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	28	
Di-n-butyltin Cation	0.8 J	3	8	17	1	7	1	. 5	
n-butyltin Cation		2	3	6	0.6 J	3		2	
Total Butyltins	1.5 J	21	142 J	91 J	2.6 J	57.5 J	1	35	

J - Analyte positively identified; value reported is greater than method detection limit, but below method reporting limit, $\mu g/kg$ - micrograms per kilogram

A blank indicates that the analysis was performed but no results were above the reporting limit.

Tri-n-butyltin, di-n-butyltin, and n-butyltin exist as cations in solution upon extraction from the soil.

Total buyltin is the sum of concentrations for tetra-n-butyltin and the tri-, di-, and mono- n-butyltin cations.

A complete data set is included in Appendix D.

Table 4-13 Polychlorinated Biphenyl Hits - Sediment Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SD-1	SD-3	SD-4S	SD-4D	SD-5S	SD-5D	SD-6S	SD-6D
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Aroclor 1016								
Aroclor 1221								
Aroclor 1232								
Aroclor 1242								
Arocior 1248						·		
Aroclor 1254								
Aroclor 1260		12	13	10	19	76	8 J	

J = Analyte was positively identified and quantitated above the method detection limit, but less than the required reporting limit. $\mu g/kg - micrograms$ per kilogram

A blank indicates that the analysis was performed but no results were above the reporting limit.

A complete data set is included in Appendix D.

Table 4-14 Total Organic Carbon - Sediment Marine Finance Site - Expanded Preliminary Assessment, ODEQ

Location	SD-1	SD-2S	SD-3S	SD-4S	SD-4D	SD-5S	SD-5D	SD-6S	SD-6D
Units	percent	percent	· percent	percent	percent	percent	percent	percent	percent
		4		·					
	i			i	i				
Total Organic Carbon	1.5	2.31	2.49	1.51	0.92	2.35	4.37	2.79	1.34

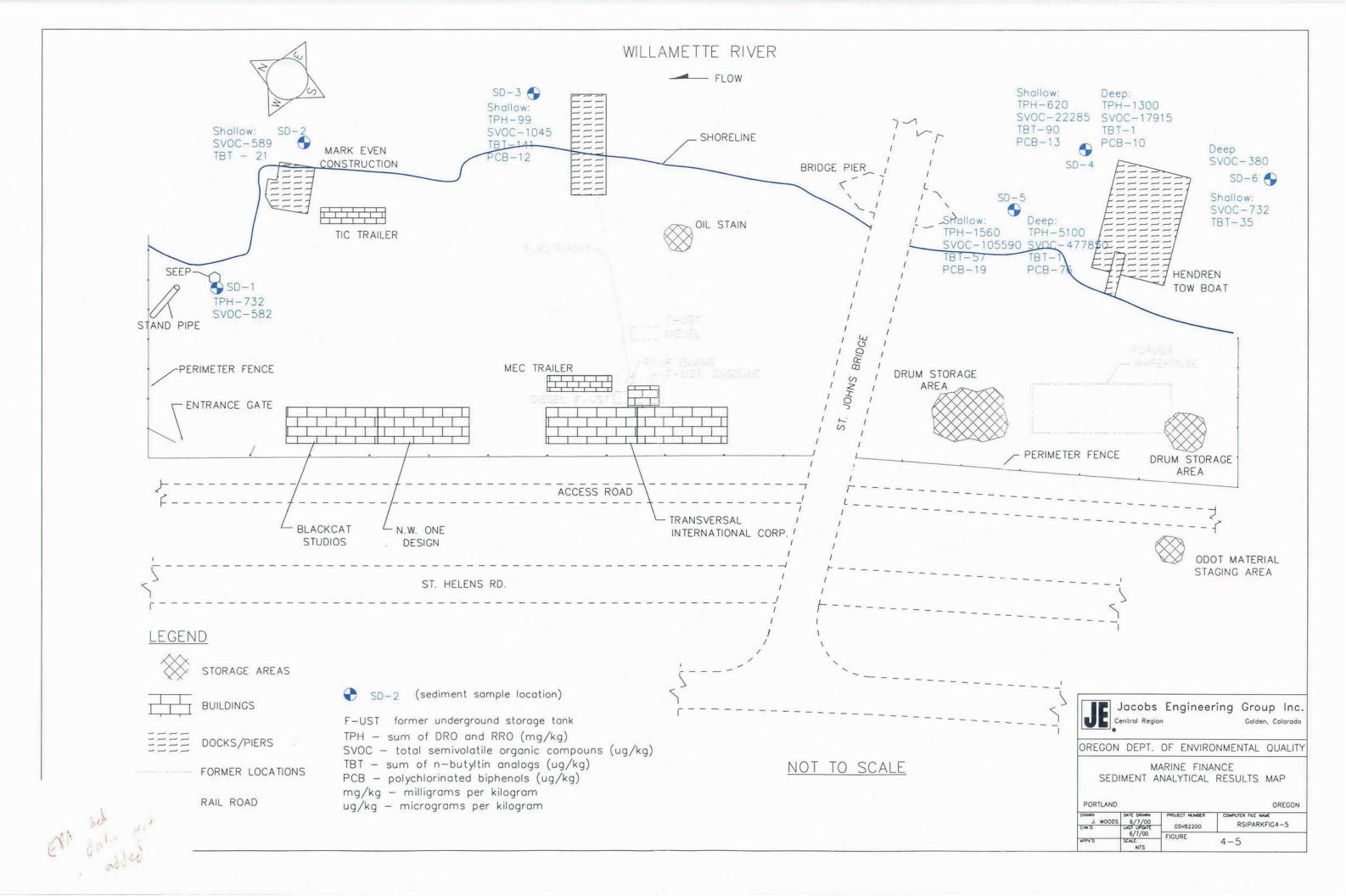


Table 4-15 Comparison Concentration Criteria - USEPA Region IX Marine Finance, Portland, Oregon

	ı		
*	Soil	Sediment ^a	Water
	ug/kg	ug/kg	ug/L
Volatile Organic Compounds		<u></u>	
Acetone	6,200,000 ^b	NA	610 ^f
Trichlorofluoromethane	2,000,000 ^b	NA NA	1300 ^f
Carbon disulfide	720,000 ^b	NA NA	1000 ^f
Chloroform	520 ^b	NA NA	0.16 ^f
	320	IVA	0.16
Semi-Volatile Organic Compounds			
Acenaphthene	38000 ^b	180	370 ^f
Acenaphthylene	NA ^c	60	NA ⁹
Anthracene	100,000,000 ^b	150	1800 ^f
Benzo(a)anthracene	2,900 ^b	360	0.092 ^f
Benzo(a)pyrene	290 ^b	500	0.0092 ^f
Benzo(b)fluoranthene	2,900 ^b	350	0.092 ^f
Benzo(k)fluoranthene	29,000 ^b	225	0.92 ^f
Benzo(g,h,i)perylene	NA ^c	250	NA ⁹
bis(2-ethylhexyl)phthalate (BEHP)	180,000 ^b	390	4.8 ^f
Chrysene	290,000 ^b	425	9.2 ^f
Dibenzo(a,h)anthracene	0.29 ^b	125	0.0092 ^f
Dibenzofuran	5,100 ^b	100	24 ^f
Fluorene	33,000 ^b	125	240 ^f
Fluoranthene	30,000,000 ^b	600	1500 ^f
Indeno(1,2,3-cd)pyrene	2,900 ^b	225	0.092 ^f
2-Methylnaphthalene	NA ^c	150	NA ^g
Phenanthrene	NA ^c	700	0.0063 ^h
Pyrene	54,000,000 ^b	700	180 ^f
Total PAH	NA ^c	NA	NA ^g
HPAH	NA ^c	2400	NA ⁹
LPAH	NA ^c	700	NA ⁹
Dalushlavingted Pinhanala			
Polychlorinated Biphenols Total PCB	1,000 ^b	180	0.034 ^f

does not show the continuent with

Table 4-15 Comparison Concentration Criteria - USEPA Region IX Marine Finance, Portland, Oregon

	Soil	Sediment ^a	Water
	ug/kg	ug/kg	ug/L
Metals (mg/kg or ug/L)			•
Aluminum	52,300 ^d	42,800	36,000 ^f
Antimony	820 ^{t,}	5	15 ^f
Arsenic	6 ^d	5	0.045 ^f
Barium	100,000 ^b	195	2,600 ^f
Beryllium	2 ^d	0.7	73 ^f
Cadmium	1 ^d	0.6	18 ^f
Chromium	27 ^d	41	110 ^f
Cobalt	100,000 ^b	19.7	2,200 ^f
Copper	34 ^d	60	1,400 ^f
Iron	36,100 ^d	45000	11,000 ^f
Lead	17 ^d	30	3.2 ⁱ
Manganese	1500 ^d	810	880 ^f
Mercury	610 ^b	0.1	11 ^f
Nickel	41,000 ^b	32	160 ⁱ
Selenium	10,000 ^b	15	: 180 ^f
Silver	10,000 ^b	1.4	. 180 ^f
Thallium	NA ^e	13	40 ⁱ
√anadium	10,000 ^b	112	260 ^f
Zinc	100,000 ^b	118	11,000 ^f
Total Organic Carbon (percent)			
Total Organic Carbon	NA NA	2	NA

a - ODEQ Portland Harbor Apparent Baseline Values.

b - USEPA Region 9 Preliminary Remediation Goals (PRGs) for industrial soil.

c - no PRG or ODEQ Ecological Risk Assessment Level II Screening Benchmark Value available.

d - Natural Background Soil Metals Concentrations in Washington State, Clark County.

e - no PRG, background concentration, or ODEQ Ecological Risk Assessment Level II Screening Benchmark Value available.

f - USEPA Region 9 PRGs for tap water.

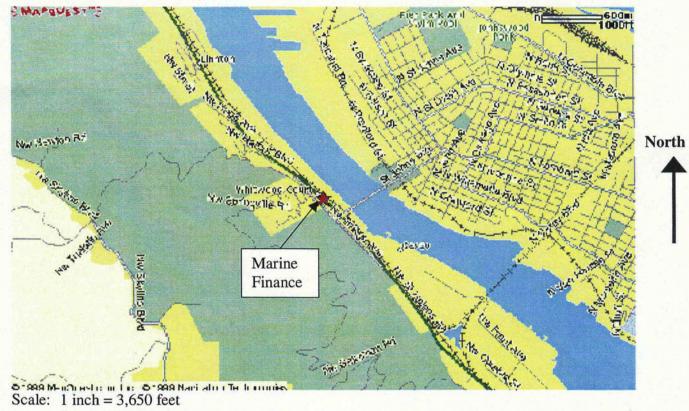
g - no PRG, ODEQ Water Quality Criteria (Table 20), or ODEQ Ecological Risk Assessment Level II Screening Benchmark Value available.

h - ODEQ Ecological Risk Assessment Level II Screening Benchmark Value.

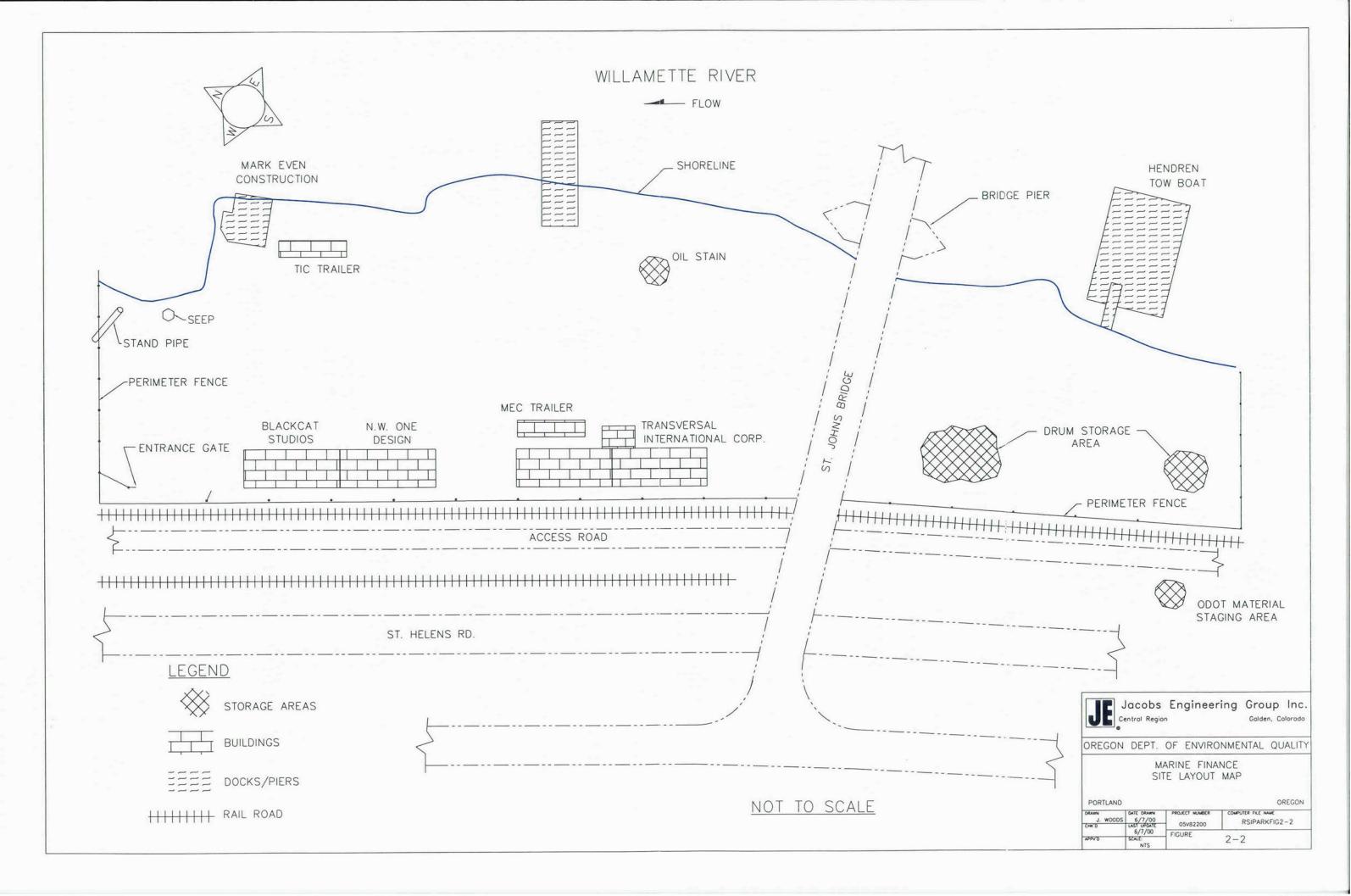
i - ODEQ Water Quality Criteria (Table 20), Fresh Water Chronic Criterion

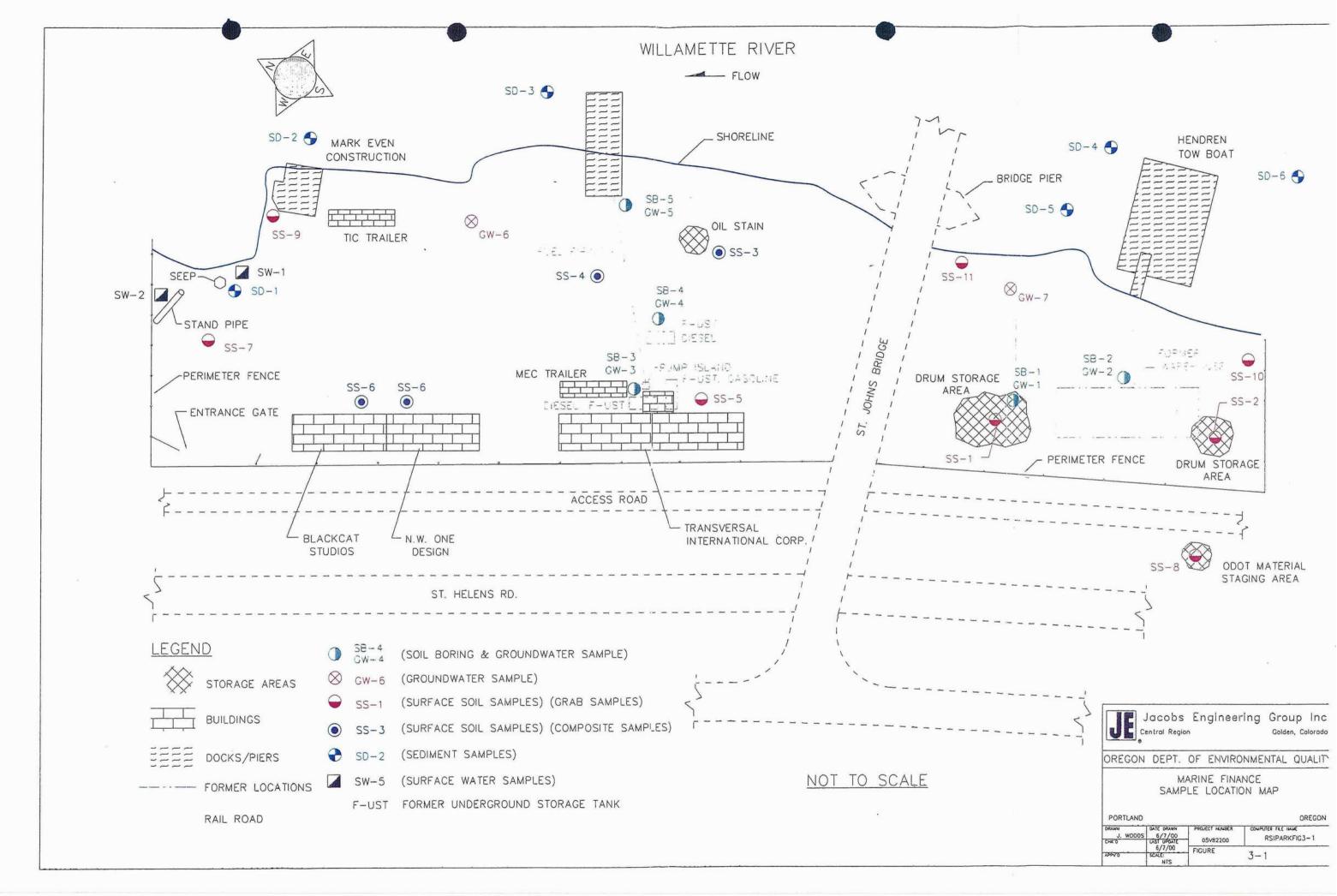
Figure 2-1

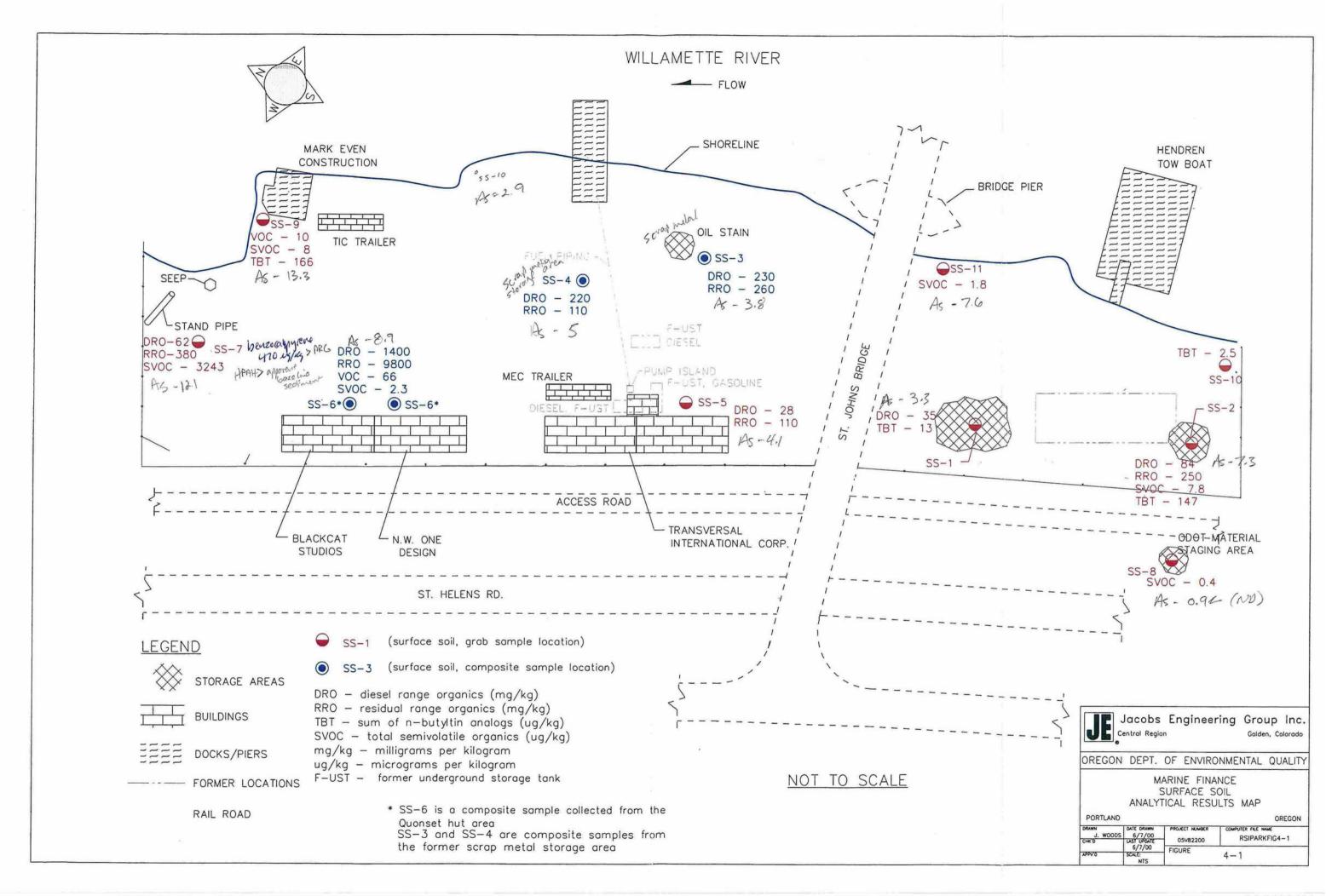
Marine Finance Site
Portland, Oregon

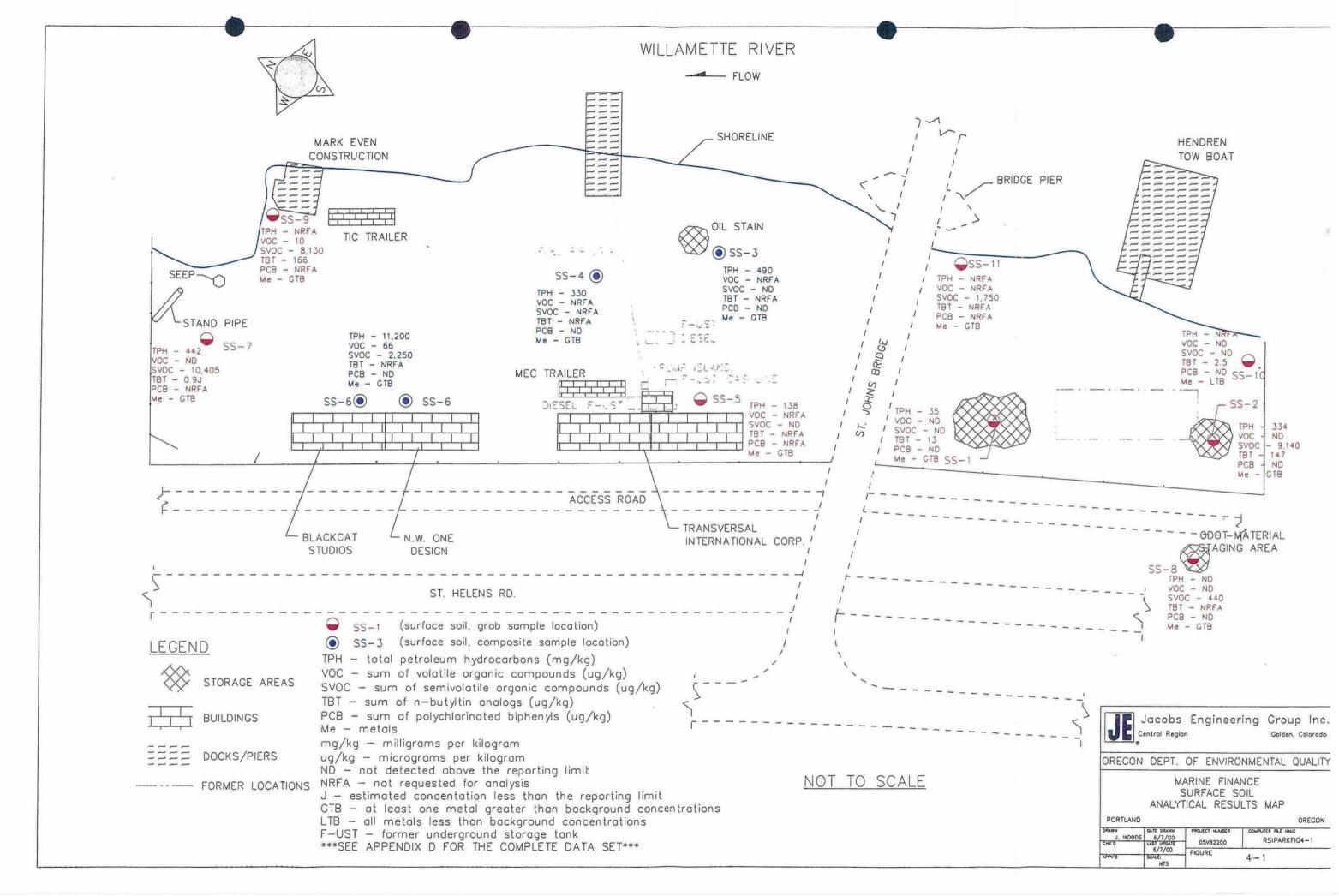


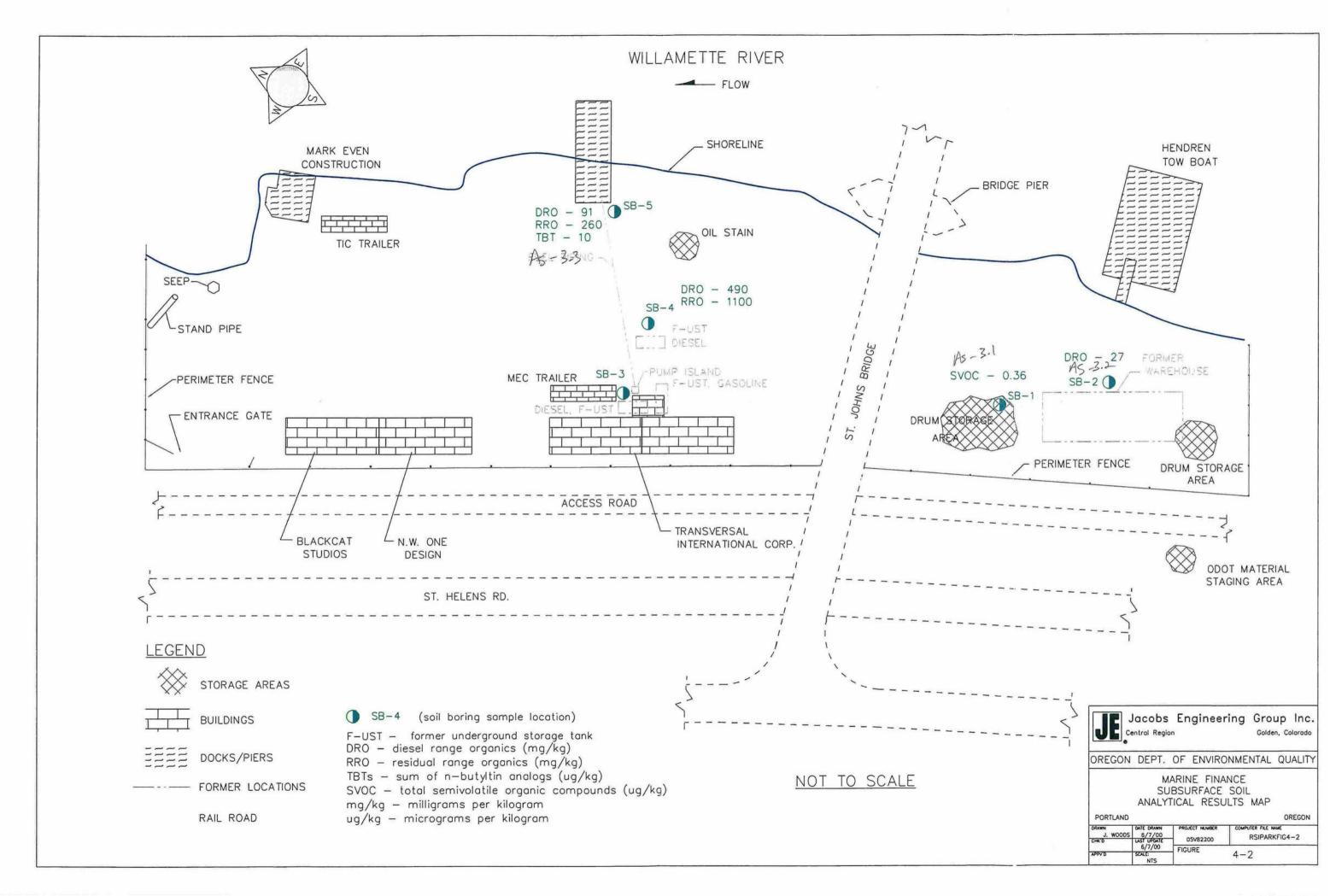
Scale: 1 inch = 3,650 feet 1 cm = 1,440 feet 1 cm = 440 m

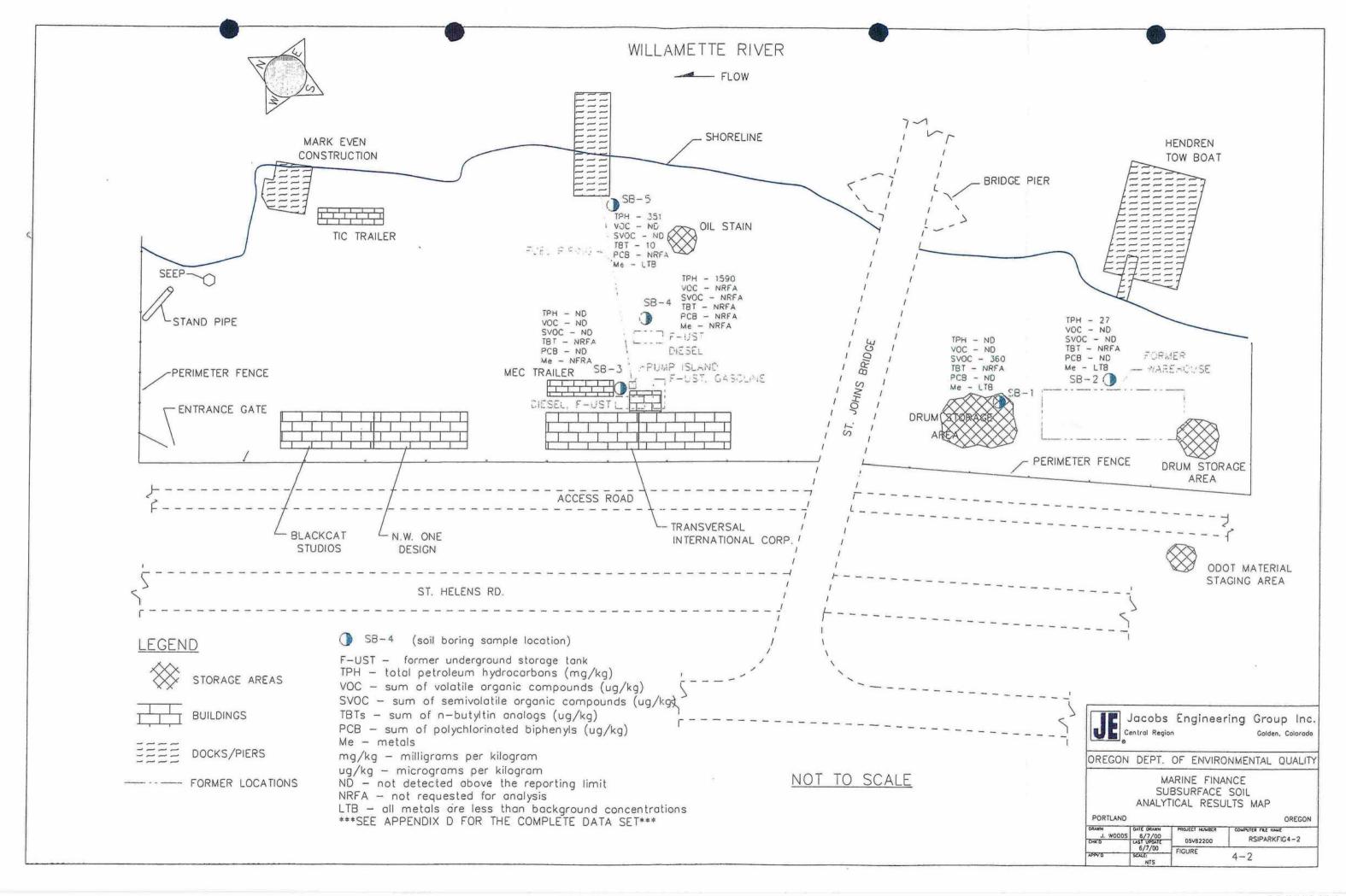


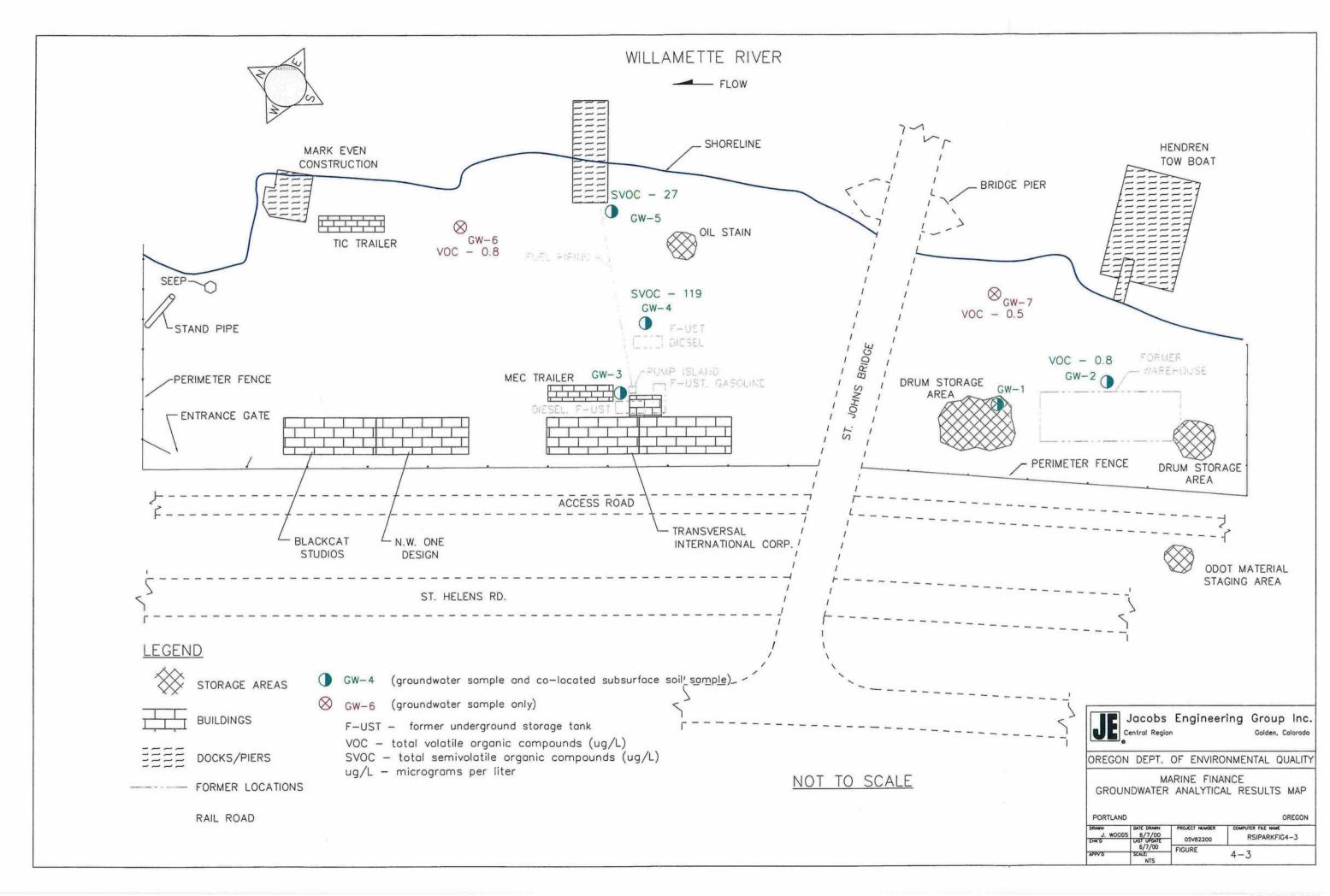


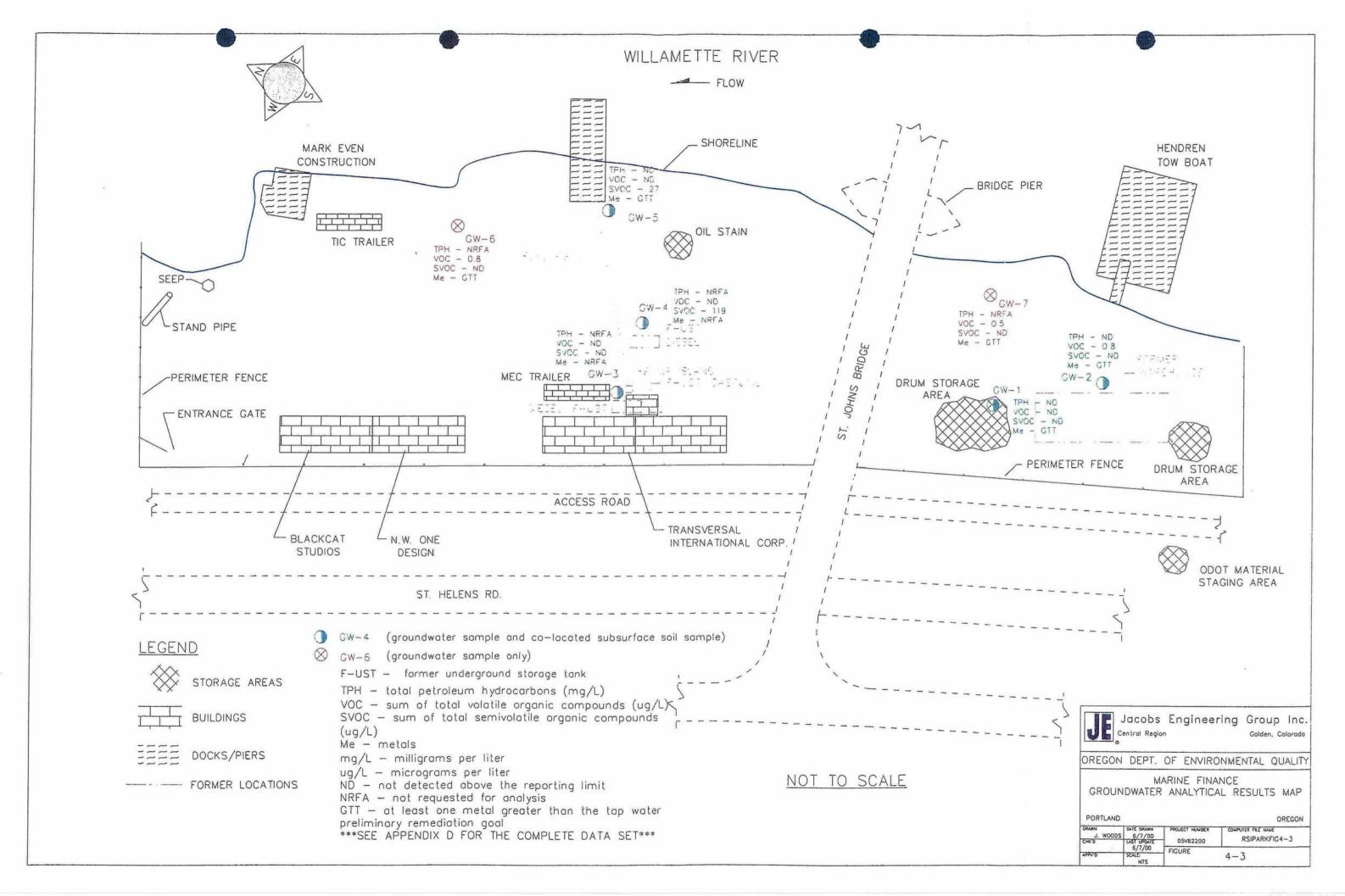


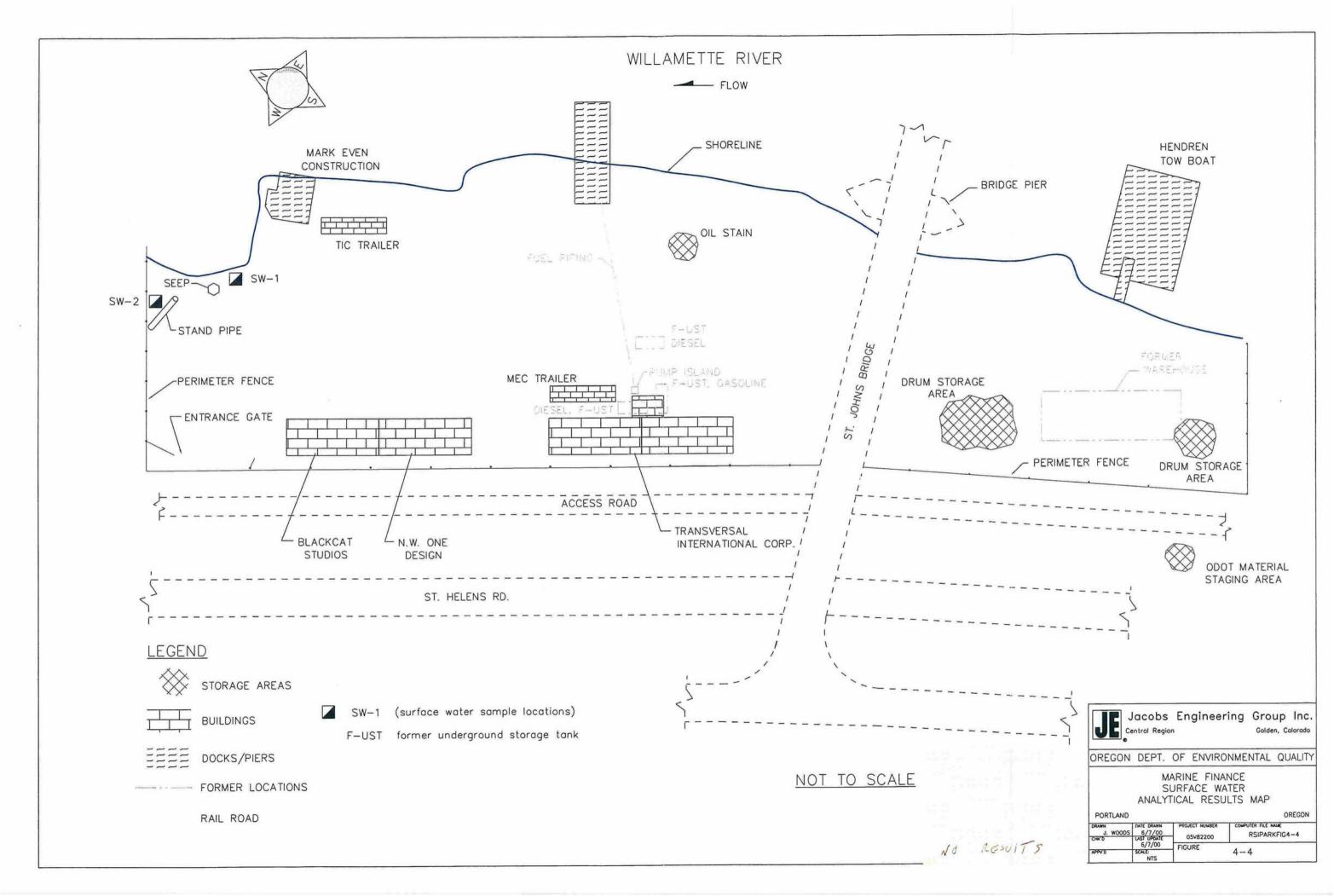












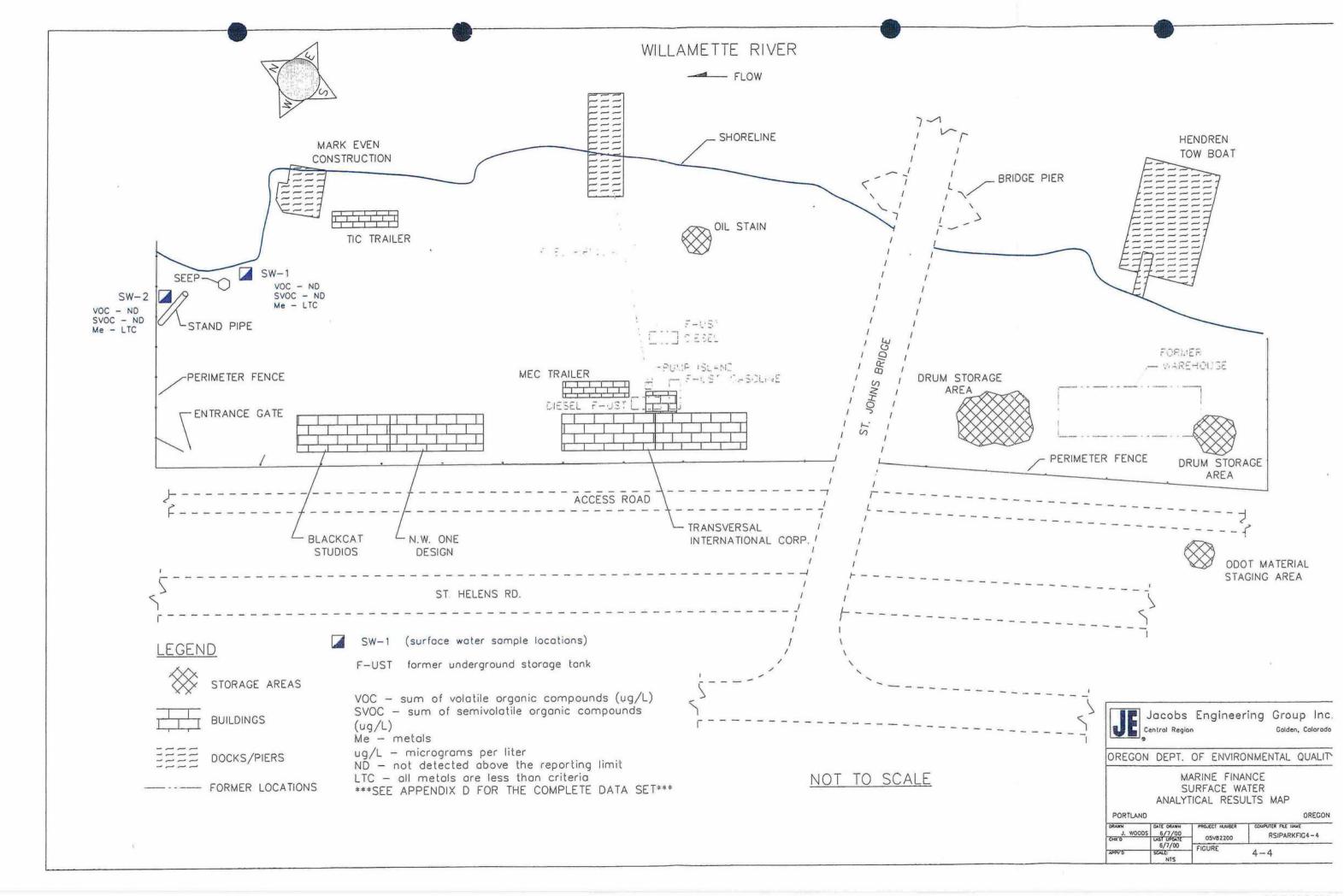


Table 2-1

Results Above Portland Harbor Baseline Maximum Values
Portland Harbor Sediment Study

Analyte (units)	SD055 (downstream)	SD055-C (Marine Finance)	SD057 (upstream)	SD057-C (upstream)	Portland Harbor Sediment Baseline Maximum Value
Copper (ppm)	18.8	64	37.8	36.8	60
Lead (ppm)	9	31	9	16	30
Mercury (ppm)	0.02	0.13	0.04	0.15	0.1
Nickel (ppm)	17.3	33	28	28.1	32
Zinc (ppm)	67.3	178	89.6	91.3	118
2-Methylnaphthalene (pppn)	<19	1400	45	60	150
Benzoic Acid (ppp)	<190	<1900	<190	240	<200
Carbazole (ppm)	31	370	210	34	100
Dibenzofuran (pppn)	<19	1300	52	32	100
Total LPAHs (ppp)	212	69410	932	3447	700
Total HPAHs (ppm)	1750	136300	2085	18950	2400
TOC (%)	l	2.2	1.2	1.2	2
Water Depth (ft)	23	23	13	13	
Sample Depth (cm)	0-10	0-90	0-10	0-90	

(DEQ, September 1999)

Note: Bolded values exceed the Portland Harbor Sediment Baseline Maximum Value.

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Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Total Organic Carbon in Sediments - August 2000

Sample ID	OR-M001902	OR-M002002	OR-M002102	OR-M002202	OR-M002204
Location	/ SD-1	SD-2	SD-3	SD-4S	SD-4D
Date Sampled	09-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000
Time Sampled	1420	0910	0955 / **	1057	1515
Units	Percent	Percent	Percent	Percent	Percent
Percent Solids	70.8	47.6	46.7	52.8	64.4
					* *
Total Organic Carbon	1.50	2.31	2.49	1.51	0.92
					en en en en en en en en en en en en en e
Sample ID	OR-M002302	OR-M002304	OR-M002402	OR-M002404	
Location	SD-5S	SD-5D	SD-6S	SD-6D	i.
Date Sampled	08-AUG-2000	.08-AUG-2000	08-AUG-2000	08-AUG-2000	
Time Sampled	1.040	1542	1109	1445	
	5	Percent	Percent	Percent	:-
Units	Percent	l erceiit	1 01 00111	. 0.00	٠.
Units Percent Solids	46.7	65.0	44.9	64.7	
					

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Tributyltins in Sediments - August 2000

Sample ID	OR-M001902	OR-M002002	OR-M002102	OR-M002202	OR-M002204
Location	SD-1	SD-2	SD-3	SD-4S	SD-4D
Date Sampled	09-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000
Time Sampled	1420	0910	0955	1057	1515
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	70.8	47.6	46.7	52.8	64.4
			and the second of		
Tetra-n-butyltin	3 U	3 U	1 J	1 J	3 U
Tri-n-butyltin Cation	0.7 J	16	130	67	5 J
Di-n-butyltin Cation	0.8 J	3	8	17	. 1
n-butyltin Cation	1 U	2	3	6	0.6 J
			Programme Communication	era di merita e se	gradient de Santa Angele de Santa Angele
			en en en en en en en en en en en en en e	and after the first section	y surject of the second second
Sample ID	OR-M002302	OR-M002304	OR-M002402	OR-M002404	gradical assertization
Sample ID Location	OR-M002302 SD-5S	OR-M002304 SD-5D	OR-M002402 SD-6S	OR-M002404 SD-6D	y suit a la manata des
			,		
Location	SD-5S	SD-5D	SD-6S	SD-6D	
Location Date Sampled	SD-5S 08-AUG-2000	SD-5D 08-AUG-2000	SD-6S 08-AUG-2000	SD-6D 08-AUG-2000	
Location Date Sampled Time Sampled	SD-5S 08-AUG-2000 1040	SD-5D 08-AUG-2000 1542	SD-6S 08-AUG-2000 1109	SD-6D 08-AUG-2000 1445	
Location Date Sampled Time Sampled Units	SD-5S 08-AUG-2000 1040 μg/kg-dry	SD-5D 08-AUG-2000 1542 μg/kg-dry	SD-6S 08-AUG-2000 1109 μg/kg-dry	SD-6D 08-AUG-2000 1445 μg/kg-dry	
Location Date Sampled Time Sampled Units	SD-5S 08-AUG-2000 1040 μg/kg-dry	SD-5D 08-AUG-2000 1542 μg/kg-dry	SD-6S 08-AUG-2000 1109 μg/kg-dry	SD-6D 08-AUG-2000 1445 μg/kg-dry	
Location Date Sampled Time Sampled Units Percent Solids	SD-5S 08-AUG-2000 1040 μg/kg-dry 46.7	SD-5D 08-AUG-2000 1542 μg/kg-dry 65.0	SD-6S 08-AUG-2000 1109 μg/kg-dry 44.9	SD-6D 08-AUG-2000 1445 μg/kg-dry 64.7	
Location Date Sampled Time Sampled Units Percent Solids Tetra-n-butyltin	SD-5S 08-AUG-2000 1040 μg/kg-dry 46.7	SD-5D 08-AUG-2000 1542 μg/kg-dry 65.0	SD-6S 08-AUG-2000 1109 μg/kg-dry 44.9	SD-6D 08-AUG-2000 1445 μg/kg-dry 64.7	

J - Analyte positively identified; value reported is greater than method detection limit, but below method reporting limit.

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment PCBs in Soils - August 2000

Sample ID	OR-M000102	OR-M000202	OR-M000302	OR-M000802	OR-M000902
Location	SB-1	SB-2	SB-3	SS-1	SS-2
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	11-AUG-2000	11-AUG-2000
Time Sampled	1130	1302	1511	0825	0925
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Percent Solids	89.2	91.4	89.3	96.3	96.3
					e egy general
Aroclor 1016	0.1 U				
Aroclor 1221	0.2 U	0.2 U	0.2 U	0.2 ∪	0.2 U
Aroclor 1232	0.1 U				
Aroclor 1242	0.1 U				
Aroclor 1248	0.1 U				
Aroclor 1254	0.1 U				
Aroclor 1260	0.1 U				

Sample ID	OR-M001001	OR-M001101	OR-M001302	OR-M001502	OR-M001702
Location	SS-3	SS-4	SS-6	SS-8	SS-10
Date Sampled	10-AUG-2000	10-AUG-2000	10-AUG-2000	10-AUG-2000	11-AUG-2000
Time Sampled	1420	1335	1550	1635	1400
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Percent Solids	95.0	94.9	96.7	94.3	95.84
Aroclor 1016	0.1 U				
Aroclor 1221	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U
Aroclor 1232	0.1 U				
Aroclor 1242	0.1 U				
Aroclor 1248	0.1 U	0.1 U	0.1 U	0,1 U	0.1 U
Aroclor 1254	0.1 U	0.1 U	0.1 U	0,1 U	0.1 U
Aroclor 1260	. 0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment TPH in Waters - August 2000

Sample ID	OR-M000107	OR-M000207	OR-M000507
Location	GW-1	GW-2	GW-5
Date Sampled	11-AUG-2000	11-AUG-2000	11-AUG-2000
Time Sampled	1150	1422	0930
Units	μg/L	μg/L	μg/L
Percent Solids	NA	NA	NA
Gasoline Range Organics	NA	NA	NA
Diesel Range Organics	250 U	250 U	250 U
Residual Range Organics	500 U	500 U	500 U

NA - Not applicable/not analyzed.

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Trace Metals in Sediments - August 2000

Sample ID	OR-M001902	OR-M002002	OR-M002102	OR-M002202	OR-M002204	OR-M002302	OR-M002304	OR-M002402	OR-M002404
Location	SD-1	SD-2	SD-3	SD-4S	SD-4D	SD-5S	SD-5D	SD-6S	SD-6D
Date Sampled	09-AUG-2000	08-AUG-2000							
Time Sampled	1420	0910	O955	1057	1515	1040	1542	1109	1445
Units	mg/kg-dry								
Percent Solids	70.8	47.6	46.7	52.8	64.4	46.7	65.0	44.9	64.7
								1 1	
Aluminum	NA.	NA	NA	NA	NA	NA	. NA	NA NA	NA NA
Antimony	0.20	0.17	1.87	0.65	0.19	0.62	0.56	0.14	0.16
Arsenic	3.7	4.3	11.1	4.9	3.8	5.8	3.6	4.6	3.7
Barium	NA NA	NA	NA	NA	NA ·	NA NA	NA	NA	NA
Beryllium	0.42	0.49	0.53	0.49	0.43	0.59	0.41	0.55	0.45
Cadmium	0.38	0.23	0.26	0.32	0.17	0.30	0.43	0.21	0.15
Calcium	NA								
Chromium	20.1	27.3	27.7	25.8	24.3	33.1	23.1	27.1	22.9
Cobalt	NA	NA	NA	NA	NA	. NA	NA	NA	NA
Copper	37.2	34.6	98.5	38.5	26.3	42.4	36.5	36.2	29.4
Iron	NA	NA	NA	NA	NA	NA	NA ·	NA	NA
Lead	36.4	13.6	28.0	27.8	10.9	232	46.0	14,3	15.1
Magnesium	NA	NA	NA	NA	NA	. NA	NA	NA	NA
Manganese	NA								
Mercury	0.02	0.06	0.09	0.07	0.07	0.11	0.18	0.08	0.14
Nickel	14.5	22.0	23.2	27.5	22.8	26.8	25.1	21.7	20.5
Potassium	NA	. NA	NA	NA	NA	NA	NA	NA	NA
Selenium	1.18 .U	1.91 U	1.95 U	2.10 U	2.22 U	2.38 U	2.20 U	2.02 Ú	2.21 U
Silver	0.05	0.30	0.35	0.35	0.22	0.35	0.49	0.32	0.25
Sodium	NA	NA	NA	.NA	NA NA	NA	NA:	NA:	, NA
Thallium	0.07	0.14	0.09	0.10	0.09	.0.14	0.07	0.10	0.06
Vanadium	NA	NA .	NA	NA	NA.	NA.	NA	NA	NA
Zinc	203	87.8	273	120	78.8	142	121	99.3	65.1

B = Element was positively identified and quantitated above the instrument reporting limit, but less than the required reporting limit NA - Not analyzed for using ultra-trace ICP/MS analytical method.

U = Element was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Metals in Waters - August 2000

Sample ID	OR-M000106	OR-M000206	OR-M000506	OR-M000603	OR-M000702	OR-M001905	OR-M002503
Location	GW-1	GW-2	GW-5	GW-6	GW-7	SW-1	SW-2
Date Sampled	11-AUG-2000	11-AUG-2000	11-AUG-2000	10-AUG-2000	10-AUG-2000	09-AUG-2000	09-AUG-2000
Time Sampled	1150	1414	0930	0930	1100	1400	1335
Units	μg/L	μg/L	μg/L	μg/L	μg/ L	μg/L	μg/L
Percent Solids	NA NA	NA	NA	NA	NA	⁸⁵ NA	NA
		:				V	
Aluminum	33,200	13,700	13,300	10,400	9,840	42.2 B	30.0 U
Antimony	34.8 B	20.0 U	25.6 B	20 U	20 U	20 U	20.0 U
Arsenic	9.3	5.5	36.9	3.7 B	5.2	1.00 U	1.00 U
Barium	305	152	182	179	103	19.4	5.2
Beryllium	1.0 B	0.4 B	0.2 B	0.9 В	0.8 U	0.8 U	0.8 U
Cadmium	0.4 U	0.4 U	0.4 U	3 ∪	3 U	3.00 U	3.00 U
Calcium	39,100	29,400	47,200	30,000	29,000	14,700	14,700
Chromium	39,3	29.8	22.5	15.6	29.4	4.00 U	4.00 U
Cobalt	37.1	9.9 B	14.7	16.6	9.2 B	5.00 U	5.00 U
Copper	47.0	18.8	95.4	24.6	20.1	3.00 U	3.00 ∪
Iron	54,900	29,700	89,300	46,100	36,700	97.5	20.9
Lead	47.5	12.5	117	25.6	11.6	1.00 U	1.00 U
Magnesium	23,300	16,400	15,700	15,800	14,900	4,640	4,640
Manganese	773	682	3,160	1,500	1,630	16	4.3 B
Mercury	0.10 U	0.10 U	0.10 U	0.10 U	0.01 U	0.10 U	0.10 U
Nickel	51.0	20.5	19.3 B	21.3	26.2	20.0 U	20.0 U
Potassium	3,700	3,080	3,320	2,310	2,600	2,000 U	2,000 U
Selenium	5.00 U	5.00 U	5.00 U	5 U	. 5 U	1.00 U	1.00 U
Silver	3.00 U	3.00 U	3.00 U	4 U	4 U	4.00 U	4.00 U
Sodium	10,300	9,510	10,100	12,200	9,310	7,450	5,720
Thallium	1.00 U	1.00 U	1.00 U	1 υ	1 υ	1.00 U	1.00 ປ
Vanadium	146	75.5	56.0	53.3	44.8	4.9 B	4.00 U
Zinc	184	76.2	227	99.9	63.3	4.4 B	2.00 U

B = Element was positively identified and quantitated above the instrument reporting limit, but less than the required reporting limit NA = Not applicable.

U = Element was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Semivolatile Organic Compounds in Waters - August 2000

Sample ID:	OR-M000105	OR-M000205	OR-M000305	OR-M000403
Location	GW-1	GW-2⊴	GW-3	GW-4
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	10-AUG-2000
Time Sampled	1150	1400	1614	1408
Units	μg/L	: μg/L	μg/L	μg/L
Percent Solids	NA	NA	NA	NA
N-Nitrosodiethylamine	24 U	25 U	25 U	24 U
Aniline	24 U	25 U	25 U	24 U
bis(2-Chloroethyl)ether	9.5 ∪	9.8 U	9.9 U	9.6 ∪
Phenol	9.5 U	9.8 U	9.9 U	9.6 U
2-Chlorophenol	9.5 U	9.8 U	9.9 U	9.6 U
1,3-Dichlorobenzene	9.5 U	9.8 U	9.9 U	9.6 U
1,4-Dichlorobenzene	9.5 ∪	9.8 U	9.9 U	9.6 U
1,2-Dichlorobenzene	9.5 U	9.8 U	9.9 U	
Benzyl Alcohol	9.5 U	9.8 U	9.9 U	9.6 U
bis(2-Chloroisoproyl)ether	9.5 U	9.8 U	9.9 U	9.6 U
2-Methylphenol	9.5 U	9.8 U	9.9 U	9.6 U
Hexachioroethane	9.5 U	9.8 U	9.9 ∪	9.6 U
N-Nitroso-di-n-propylamine	9.5 U	9.8 U	9.9 U	9.6 U
3- and 4-Methylphenol	9.5 U	9.8 U	9.9 U	9.6 U
Nitrobenzene	9.5 U	9.8 U	9.9 U	9.6 U
Isophorone	9.5 U	9.8 U	9.9 U	9.6 U
2-Nitrophenol	9.5 U	9.8 U	9,9 U	9.6 U
2,4-Dimethylphenol	9.5 U	9.8 U	9.9 U	9.6 U
bis(2-chloroethoxy)methane	9.5 U	9.8 ປ	9.9 U	9.6 U
2,4-Dichlorophenol	9.5 U	9.8 ∪	9.9 ∪	9.6 U
Benzoic Acid	24 U	25 U	25 ∪	24 U
1,2,4-Trichlorobenzene	9.5 U	9.8 U	9.9 U	9.6 U
Naphthalene	9.5 U	9.8 U	9.9 ∪	9.6 U
4-Chloroaniline	9.5 U	9.8 ∪	9.9 ∪	9.6 U
Hexachlorobutadiene	9.5 U	9.8 U	9.9 U	9.6 U
4-Chloro-3-methylphenol	9.5 ∪	9.8 U	9.9 U	9.6 U
2-Methylnaphthalene	9.5 U	9.8 ∪	9.9 U	9.6 U
Hexachlorocyclopentdiene	9.5 U	9.8 U	9.9 U	9.6 U
2,4,6-Trichlorophenol	9.5 U	9.8 U	9.9 ∪	9.6 U
2,4,5-Trichlorophenol	9.5 ∪	9.8 U	9.9 U	9.6 U
2-Chloronaphthalene	9.5 U	9.8 U	9.9 U	9.6 U
2-Nitroaniline	24 U	25 U	25 U	24 U
Acenaphthylene	9.5 ∪	9.8 U	9.9 ∪	9.6 U
Dimethylphthalate	9.5 U	9.8 U	9.9 U	9.6 U
2,6-Dinitrotoluene	9.5 U	9.8 U	9.9 U	9.6 U
Acenaphthene	9.5 U	9.8 U	9.9 U	9.6 U

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Semivolatile Organic Compounds in Waters: August 2000

Sample ID	OR-M000105	OR-M000205	OR-M000305	OR-M000403
Location	GW-1	GW-2	GW-3	GW-4
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	10-AUG-2000
Time Sampled	1150	1400	1614	1408
Units	μg/L	μg/L	μg/L	μg/L 184
Percent Solids	NA	NA :	NA	NA:
3-Nitroaniline	24 U	25 U	25 [°] Ü	24 U
2,4-Dinitrophenol	24 U	25 U	25 U	24 U
Dibenzofuran	9.5 U	9.8 U	9.9 U	9.6 U
4-Nitrophenol	24 U	. 25 U	25 U	24 U
2,4-Dinitrotoluene	, 9.5 U	9.8 U	9.9 ∪	9.6 U
Fluorene	9.5 U	9.8 ∪	9.9 U	9.6 U
4-Chlorophenylphenyl ether	9.5 U	9.8 U	. 9.9 U	9.6 U
Diethylphthalate	9.5 U	9.8 U	9.9 Ü	9.6 U
4-Nitroaniline	24 U	25 U	25 U	24 U
2-Methyl-4,6-Dinitrophenol	24 U	25 U	25 U	24 Ú
N-Nitrosodiphenylamine	9.5 U	9.8 U	9.9 U	9.6 U
4-Bromophenylphenyl ether	9.5 U	9.8 U	9.9 U	9.6 Ù
Hexachlorobenzene	9.5 U	9.8 U	9.9 U	9.6 ປ
Pentachlorophenol	24 U	25 U	25 Ú	24 U
Phenanthrene	9.5 U	9.8 U	9.9 U	18
Anthrecene	9.5 U	9.8 U	9.9 U	9.6 U
Di-n-butylphthalate	9.5 U	9.8 U	9.9 U	9.6 U
Fluoranthene	9.5 U	9.8 U	9.9 U	27
Pyrene	9.5 U	9.8 ∪	9.9 U	26
Butylbenzylphthalate	9.5 ∪	9.8 U	9.9 U	9.6 ∪
3,3'-Dichlorobenzidine	24 U	25 U	25 U	24 U
Benz(a)anthracene	9.5 ∪	9.8 U	9.9 U	9.6 U
Chrysene	9.5 U	9.8 U	9.9 U	9.9
bis(2-Ethylhexyl)phthalate	9.5 U	9.8 U	9.9 U	9.6 U
Di-n-octylphthalate	9.5 U	9.8 ∪	_9.9 Ù	9.6 U
Benzo(b)fluoranthene	9.5 U	9.8 U	9.9 U	9.6 U
Benzo(k)fluoranthene	9.5 U	9.8 U	9.9 U	9.6 U
Benzo(a)pyrene	9.5 U	9.8 U	9.9 U	13
Indeno(1,2,3-cd)pyrene	9.5 U	9.8 U	9.9 U	11
Dibenz(a,h)anthracene	9.5 ∪	9.8 U	9.9 U	9,6 U
Benzo(g,h,i)perylene	9.5 U	9.8 U	9.9 U	14

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Semivolatile Organic Compounds in Waters - August 2000

Sample ID	OR-M000505	OR-M000602	OR-M000702	OR-M001904	OR-M002502
Location	GW-5	GW-6	GW-7	SW-1	SW-2
Date Sampled	11-AUG-2000	10-AUG-2000	10-AUG-2000	09-AUG-2000	09-AUG-2000
Time Sampled	0930	0930	1100	1400	1325
Units	μg/L	μg/L	μg/L	μg/L	μg/L
Percent Solids	NA	NA ·	NA	NA	NA
					
N-Nitrosodiethylamine	27 U	24 U	25 U	24 U	25 U
Aniline	. 27 U	24 U	25 U	24 U	25 ∪
bis(2-Chloroethyl)ether	11 U	9.5 U	10 U	9.6 U	9.9 ∪
Phenol	11 U	9.5 U	10 U	9.6 U	9.9 U
2-Chlorophenol	11 U	9.5 ∪	10 U	9.6 U	9.9 ∪
1,3-Dichlorobenzene	11 U	9.5 U	. 10 U	9.6 U	9.9 U
1,4-Dichlorobenzene	11 U	9.5 U	10 U	9.6 ປ	9.9 U
1,2-Dichlorobenzene	11 U	9.5 U	10 U	9.6 U	9.9 U
Benzyl Alcohol	11 U	9.5 U	10 U	9.6 U	9.9 Ü
bis(2-Chloroisoproyl)ether	11 U	9.5 U	10 U	9.6 U	9.9 U
2-Methylphenol	11 U	9.5 U	10 U	9.6 U	9.9 U
Hexachloroethane	-11 U	9.5 <u>U</u>	10 U	9.6 U	9.9 ∪
N-Nitroso-di-n-propylamine	11 U	9.5 U	10 Ü.	9.6 U	9.9 U
3- and 4-Methylphenol	11 U	9.5 U	10 U	9.6 U	9.9 U
Nitrobenzene	11 U	9.5 U	10 U	9.6 U	9.9 ∪
Isophorone	11 U	9.5 U	10 U	9.6 ປ	9.9 U
2-Nitrophenol	11 U	9.5 U	10 U	9.6 U	9.9 U
2,4-Dimethylphenol	11 U	9.5 U	10 U.	9.6 U	9.9 U
bis(2-chloroethoxy)methane	11 U	9.5 U	10 U	9.6 U	9.9 U
2,4-Dichlorophenol	11 U	9.5 U	10 U	9.6 U	9.9 U
Benzoic Acid	27 U	24 U	25 U	24 U	25 ∪
1,2,4-Trichlorobenzene	11 U	9.5 U	10 U	9.6 U	9.9 U
Naphthalene	11 U	9.5 U	10 U	9.6 U	9.9 U
4-Chloroaniline	11 U	9.5 U	10 U	9.6 U	9.9 ∪
Hexachlorobutadiene	11 U	9.5 U	10 U	9.6 U	9.9 U
4-Chloro-3-methylphenol	11 U	9.5 U	10 U	9.6 U	9.9 U
2-Methylnaphthalene	11 U	9.5 U	10 U	9.6 U	9.9 U
Hexachlorocyclopentdiene	11 U	9.5 U	10 U	9.6 U	9.9 ∪
2,4,6-Trichlorophenol	11 U	9.5 U	10 U	9.6 U	9.9 U
2,4,5-Trichlorophenol	11 U	9.5 U	10 U	9.6 U	9.9 U
2-Chloronaphthalene	11 U	9.5 U	10 U	9.6 U	9.9 U
2-Nitroaniline	27 U	24 U	25 U	24 ∪	25 U
Acenaphthylene	11 U	9.5 U	10 U	9.6 U	9.9 U
Dimethylphthalate '	11 U	9.5 U	10 U	9.6 U	9.9 U
2,6-Dinitrotoluene	11 U	9.5 U	10 U	9.6 U	9.9 U
Acenaphthene	11 U	9.5 U	10 U	9.6 U	9.9 U

I:\oregndeq\05V82200\common\Results\ MF-Raw_Lab_Data.xls - SVOCs-Waters

Page 3 of 4

. 10/5/00 - 10:20 AM

JACOBS ENGINEERING GROUP INC. 1670 BROADWAY, SUITE 3200, DENVER, COLORADO 80202

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PRO	JECT NUMB	ER: 0378270)					·		South 13th Avenue	1.	
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SAMPLING COMMENTS:	:	- K	ja L	V. M
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BORING LOG

Borehole ID: 53-0/ Sheet ____ of _2

	:	•	L	oostio	Hund Oc
Project Name NWIN FINANCE	Project Number	LTCCODE (IRPIMS)	Si	te ID	LPRCODE (IRPIMS)
Drilling Company	Macus	Ground Elevation	Т	otal Dr	illed Depth
Drilling Equipment Drilling	Method Borehole Diameter	Date/Time Drilling Started	D	ate/Tin	ne Total Depth Reached
Type of Sampling Device Macro		Water Level (bgs) First	F	inal	151
Sample Hammer Type Driving	Wt. Drop	Hydrogeologist M Johnson			by/Date
Location Description (include sketch in f					
Depth Interval Recovery Blow Counts uotation	Description thology, grain size, sorting, angulari minerology, bedding, plasticity, den applicable)	isity, consistency, etc., as	USCS Symbol Lithology	Water Content	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
3	-m w/TT 3	ilt, brogs		n	O.Oppm O.Oppm Go-Volatile Sample 6-8

BORING LOG

	and the second of the second o		•		Location	Portland	OR
Project Name Marine Finance		iber de la la la la la la la la la la la la la	LTCCODE (IRPIMS)	responding to the second secon	Site ID		LPRCODE (IRPIMS)
and the second s	Driller	arcus	Ground Elevation		Total Dril	lled Depth	
the state of the s	Drilling Method	Borehole Diameter	Date/Time Drilling Started 8 /11 /00 /040	Lanti.		e Total Depth Re	ached
Type of Sampling Device MaCro	and the second s		Water Level (bgs) First / 6.0		Final	15.6	
Sample Hammer Type	Driving Wt.	Drop	Hydrogeologist M. Johnson		Checked	by/Date	endage, da dasa, agail.
Location Description (include s	ketch in field logbook)		1.45%	gradi.		- 19 Post - 1	en de la Contraction de la Con
			ty, Munsell color name & saity, consistency, etc.; as	USCS Symbol	Lithology Water Content		Remarks nple types & depth, odor, or measurements, etc.)
14 B	m ind ing F-m, poo	ody grade	tel, Brishgray		www	0.7 pp	n(Liner?)

Approximately and the second s		•	_	,	
				eation Of	Hand, Or
Project Name Marian Finance	Project Number	LTCCODE (IRPIMS)	1	E ID	LPRCODE (IRPIMS)
	Driller	Ground Elevation	Tot	al Drill	ed Depth
Drilling Equipment Drilling M	the state of the s	Date/Time Drilling Started			Total Depth Reached
Type of Sampling Device		Water Level (bgs)794	ع (11/	00 12 3
Muco	t na his shall had	First + 18	Fir	nal	16
Sample Hammer Type Driving V	in the second se	Hydrogeologist My bhoso	Che	ecked b	y/Date
Location Description (include sketch in fie	Y	1 10 1 (10.113,58)	7 —	<u> </u>	Section 2 section 1 section 2
	<u> </u>		=1	F	
Depth Interval Int	Description		USCS Symbol Lithology	Content	Remarks
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- Sithy Sam	Cly Gave 1 R	91 /	"	2	organic vapor measurements, etc.)
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	· 6 .		Portlund	or
Project Name Marine Finance.	Project Number	LTCCODE (IRPIMS)	Site ID	LPRCODE (IRPIMS)
Drilling Company	Driller / Wens	Ground Elevation	Total Drilled Depth	
Drilling Equipment Drillin	Method Borehole Diameter	Date/Time Drilling Started 8/11/00 1230	Date/Time/Total Depth R	eached
Type of Sampling Device Macro		Water Level (bgs)	Final E	18.3
Sample Hammer Type Driving	g Wts Drop	Hydrogeologist M Johnson	Checked by/Date	
Location Description (include sketch in				
	Description ithology, grain size; sorting, angular , minerology, bedding, plasticity, der applicable)	nsity, consistency, etc., as		Remarks mple types & depth, odor, por measurements, etc.)
	SAND F-M,	Pigral brasi	W 13:02	Jars from

BORING LOG

Borehole ID: 53

			en en en en en en en en en en en en en e				Location	Hand,	00
	Project Name	FIRE	Project Nu	e2200	LTCCODE (IRPIMS)	1 (m) 1 (1)	Site ID		LPRCODE (IRPIMS)
1.7476	Drilling Compan		Driller	Talana di Santa di S Santa di Santa di Sa	Ground Elevation		Total D	rilled Depth	ANGELIE EN LA COMPANIA
*	Drilling Equipme	10.00	Drilling Method	Borehole Diameter	Date/Time Drilling Started	7	101	me Total Depth	Reached
	Type of Samplin	ng Device MACK	20 S		Water Level (bgs) First 30	<u></u>	Final	700	
	Sample Hammer		Driving Wt.	Drop	Hydrogeologist M JOHNSON		T	d by/Date	"#; "
-		ption (include s	ketch in field logbook		y v v v v v v v v v v v v v v v v v v v		(r		
4 5	Depth. Interval. Recovery	M M	notation, minerology,	bedding, plasticity, de applicable)	nity, Munsell color name & nsity, consistency, etc., as	USCS Symbol	Lithology	(Include all	Remarks sample types & depth, odor,
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Project Name	Finance	Project Number	LTCCODE (IRPIMS)		Site I	D LPRCODE (IRPIMS)
Drilling Company	Lista Contract	Driller Wycus	Ground Elevation		Total	Drilled Depth
Drilling Equipment	Drilling		B/11/00 /23	0	Date/	Time Total Depth Reached
Type of Sampling D	Macro		Water Level (bgs)	B	Fina	18.3
Sample Hammer Type	andrycheast Drivine	Wt. Drop	Hydrogeologist husov	<u>a</u>	Chec	ked by/Date
Location Description	n (include sketch in f	ield logbook)		San San Carlo	 	kan a megatikan gali beraja di kecamatan beraja di kecamatan beraja di kecamatan beraja di kecamatan beraja di Menanggarian di Keramatan Beraja di Keramatan Beraja di Keramatan Beraja di Keramatan Beraja di Keramatan Beraj
Depth Interval Recovery Blow Counts		Description thology, grain size, sorting, angu minerology, bedding, plasticity, applicable)		USCS Symbol	Lithology	Remarks O Logo (Include all sample types & depth, odor, organic vapor measurements, etc.)
22 23 24 35 27	Fire Sa Fift EOE	ma, micacens	s, at gry		4	Hope Hope Sample LV. 1: He @ 20'

SAN BORING LOG

Borehole IDSB-3 Sheet 2 of 3

24	Grands and Art	عكانا والمتمادات				•							
- Kar	Car Secretaria	and Andrews Mark Ca							Loc	ation		-	
Project Name	Firan	Si er	Project Nu	mber 3220C)	LTCCODE (IRPIM	(S)		Site	ID		LPRCODE	(IRPIMS)
Drilling Com	pany	potenia a a se Migil Pase II Se	Driller		4.	Ground Elevation			Tota	l Dri	lled Depth		
Drilling Equi	pment 25e	Drilling	Method 7	Borehole Dia	meter	Date/Time Drilling	Started 1577			/Tim	e Total Depth R	eached	3 ^
Type of Sam	pling Device MAC	eo.				Water Level (bgs) First	5		Fin			75	20
Sample Hami	ner (1967)	Driving	.w. —	Drop		Hydrogeologist N V Hm	Soul	121			by/Date	1	
	cription (include						~					1 1	e e e e e e e e e e e e e e e e e e e
Depth Interval	Blow Counts	(Include lit	hology, grain	Description size, sorting, a	angulari	ty, Munsell color nan sity, consistency, etc.	ie &	USCS Symbol	Lithology	Water Content	(Include all sa	Remarks	denth odor
	5an			applicab				ns		Wa	organic va	oor measurem	ents, etc.)
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Project Name Mayie F	Project N	umber 2	LTCCODE (IRPIMS)	ad vegyv NGAN	Site ID	LPRCODE (IRPIMS
Drilling Company	Driller Joh	me	Ground Elevation	und UNA:	Total Dri	lled Depth 24
Drilling Equipment	Drilling Method	Borehole Diameter	Date/Time Drilling Start	1507	Date/Tim	e Total Depth Reached
Type of Sampling Devi	ce Www.		Water Level (bgs) C First ZO, S		Final	
Sample Hammer	Driving Wt.	— Dron	Mydrogeologist Mydrosor	landa en dis	Checked	by/Date
Location Description (in	oclude sketch in field logboo	k)		i sayati i teta	er er er er	State Control of the state of t
Depth Interval Recovery Blow Counts			ity, Munsell color name & nsity, consistency, etc., às		Lithology Water Content	Remarks (Include all sample types & depth, od organic vapor measurements, etc.)
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Project Name Marine Finance	Project Number	LTCCODE (IRPIMS)	Si	te ID		LPRCODE (IRPIMS)
Drilling Company	Driller	Ground Elevation	То	tal Dri	illed Depth	
Drilling Equipment Drilling	Method Borehole Diameter	Date/Time Drilling Started		te/Tin	ne Total Depth Re	ached 13Ux
Type of Sampling Device MACLO		Water Level (bgs) First 21.0	F	inal		
Sample Hammer Type Driving	Wt. Drop	Hydrogeologist MJOhn5M	Ch	ecked	by/Date	
Location Description (include sketch in f	ield logbook)					
notation,	Description hology, grain size, sorting, angular minerology, bedding, plasticity, der applicable)	nsity, consistency, etc., as	USCS Symbol Lithology	Water Content	(Include all san	Remarks aple types & depth, odor, or measurements, etc.)
5:Hy San	applicable) My gray Tr. Silt, Drk of grave (b)	x00U.			0.0 pg	

BORING LOG

						Loc	portland, OR		
Project Name	Finance			LTCCODE (IRPIMS)	age sets of a file	Site	ID .	LPRCODE (IRPIMS)	
Marine Drilling Company Geotech	in the state of th	の玄い名。 Driller	u kannalii in e	Ground Elevation	137 (18.1	Tota	d Dri	illed Depth 24	
Orilling Equipment Geoprob			orehole Diameter	Date/Time Drilling Started	D	Date	e/Tim	ne Total Depth Reached 1340	
Type of Sampling I	Device Ma(10		layar pa li (d)	Water Level (bgs) First 21. D		Fin			
Sample Hammer	Driving	We -	Drop	Hydrogeologist M. Johns	on :	Che	cked	by/Date	
Type Location Description	on (include sketch in f	Caramana and American			nya dibi	G Z	· #	g Alder Court of State (State)	
Depth Interval Recovery Blow Counts		thology, grain siz minerology, bedo	Description e, sorting, angular ling, plasticity, der applicable)	ity, Munsell color name &	USCS Symbol	Lithology	Water Content	Remarks (Include all sample types & depth, odor organic vapor measurements, etc.)	
	15. Hy 5	and. Dr	t smy				M	0.0 ppm	
3 - 7	1 (2)		4						
作料	Sandy Sil	t, Ock.	gray, Tr	F. gravel			س		
SER	Sance 1	=-m, D	rk gray	F. gravel			m		
	<u>.</u>			*					
8									
	Sitty Sur Chips -	original original	ibundas 1 groun	nt wood	?				
/_ /- / /- \						<u> </u>	<u> </u>		

	and the second		en en en en en en en en en en en en en e		•		Loc	ation	Hand, OR
	Project Name Marine	Einance	Project Nur	9220	LTCCODE (IRPIMS)		Site		LPRCODE (IRPIMS)
	Drilling Company Geotle	and Aberbane	Driller	VIII - 30240	Ground Elevation		Tota	l Dril	lled Depth
	Drilling Equipment	Dr	illing Method	Borehole Diameter	Date/Time Drilling Started	2 (148 ²) 13 14	Date	/Tim	e Total Depth Reached
	Type of Sampling D		-0	4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Water Level (bgs) First 21 0	· · · · · ·	Fin	al	
	Sample Hammer Type	D	riving Wt.	/ Drop	Hydrogeologist M. Johnson	\	Che	cked	by/Date
*	Location Description	ı (include skete	ch in field logbook)				1		
	Depth Interval Recovery Blow Counts	nota	ation, minerology, b	edding, plasticity, den applicable)	ity, Munsell color name & sisty, consistency, etc., as	USCS Symbol	Lithology	Water Content	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
			Sand.		7	1		W	With Dx mood 401. The sample DR. mood 402 3 VOA 8260 DR. mood 403 IL. 8270

A O Lord Co.			Location Tortland	2,00
Project Name NEW IN FINANCE	Project Number 05V22200	LTCCODE (IRPIMS)	Site ID	LPRCODE (IRPIMS)
Drilling Company	Driller tutted weeds to be of	Ground Elevation	Total Drilled Depth	
Drilling Equipment Drilling 1	Method Borehole Diameter	Date/Time Drilling Started	Date/Time Total Depth R	leached 0850
Type of Sampling Device	gygda chwe i sa gy geld (1975 - 19	Water Level (bgs) First 21.	Final 21.0	A Commission of the commission
Sample Hammer	Wt. Drop	Hydrogeologist M. Johnson	Checked by/Date	ा प्रकार के किए के जो है। र
Type Driving Location Description (include sketch in fi	**	The stage of the	Technologies (September 1997)	
	Description hology, grain size, sorting, angulari ninerology, bedding, plasticity, den applicable)			Remarks ample types & depth, odor, por measurements, etc.)
6 1 1 1 1 1 1 1 1 1	F-M poorly gray	graded clik		

Commence of the second			•			-4:	
<u></u>		<u>.</u>			1.60	ation	
Project Name Mune	Finance	Project Number OSV902200	LTCCODE (IRPIMS)		Site	ID	LPRCODE (IRPIMS)
Drilling Company	(1. 1. 1.60 PM) L	Driller	Ground Elevation		Tota	l Dri	iled Depth
Drilling Equipment	Drilling I	Method Borehole Diameter	Date/Time Drilling Started	3 a g	Date	/Tim	e Total Depth Reached
Type of Sampling D	Nacro		Water Level (bgs) First 21.0	'	E:-	<i>[] [</i>]	21.0
Sample Hammer			Hydrogeologist				by/Date
Location Description	Driving n (include sketch in fi		M JOHNSO		l		Service Control of the
Depth Interval Recovery Blow Counts	(Include lit notation, r	Description hology, grain size, sorting, angular ninerology, bedding, plasticity, der applicable)	ity, Munsell color name &	USCS Symbol	Lithology	Water Content	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
	- Sbugh	nd as above				m	1.1 ppm 1.3 ppm 1.000 502 \ m 000 503 \ 18 - 18 \ m 000 503 \ 1.6 ppm Soil voktiks @ Bemoossoi

Borehole ID: SB-05Sheet 3 of 3

and a substitute of the substi	and the second s		•	•. •		Location	tland	DC
Project Name Maine	Finance	Project Number	200	TCCODE (IRPIMS)		Site ID		LPRCODE (IRPIMS)
Drilling Company	the same of the second of the same	Driller	G	round Elevation	4 pt (5 %)	Total Dril	led Depth	
Drilling Equipmen		Method Boreho	2" 2	Sure Drilling Started	47	Date/Tim	e Total Depth R	eached
Type of Sampling	Device ACCO	22 V.L.		Vater Level (bgs) irst <u>Z (,)</u>		Final	21.0	
Sample Hammer	Driving	Wt. — Pro		ydrogeologist M. 10hnSc	2	Checked	by/Date	
A DESCRIPTION OF THE PARTY OF T	ion (include sketch in t		 	5		e	18. 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	
Depth Interval	(Include li notation,	thology, grain size, so minerology, bedding,	escription rting, angularity, plasticity, densit pplicable)	Munsell color name & o y, consistency; etc.; aso	USCS Symbol	Lithology Water Content		Remarks mple types & depth, odor, oor measurements, etc.)
21	#	I trace 5		•	-0	2		
4							Whiter push s to 27	Slow in

and an in the state of the stat						•		Loc	ation	<u> </u>
Project Nan	ne			Project Nur	nber	LTCCODE (IRPIMS)	1 :	Site		EPREODE (IRPIMS)
Mari	ine	Fina	we.	0511	82200		erika <u>Johan</u> a salah			
Drilling Con	mpany TecV		3 - 4 - 4 - 3 - 4 - 4 - 4 - 3 - 4 - 4 - 4 - 4	Driller		Ground Elevation		Tota	d Dril	led Depth
Drilling Equ Geof			i	Method PT	Borehole Diameter	Date/Time Drilling Started	0	Date	/Tim	e Total Depth Reached
Type of Sar	mpling [Device M	acro		. Market L.	Water Level (bgs)		Fin	ıal 🧠	
Sample Han	nmer	194 / / i	Drivins	wt.	Drop	Hydrogeologist M. Johnson	J. J & .	Che	cked	by/Date
Location De	escriptio	n (include	sketch in f	field logbook)						
Depth	Recovery Blow Counts		notation,	minerology,	bedding, plasticity, de applicable)	rity, Munsell color name & nsity, consistency, etc., as	USCS Symbol	Lithology	Water Content	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
/ 				,	· · · · · · · · · · · · · · · · · · ·	F, angular	n en		O	0.0 ppn
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	-									0.0 pm

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Borehole ID Constant Sheet 2 of 3

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for the first section	Project	SIN	<u> </u>	Finan	A	Project Nu	mber <i>422.C</i>	ර	LTCCODE (II	RPIMS)	and the second	Site	D	LPRCODE (IRPIMS)
er i seestek	Drilling	g Comp	any L	in and seek allested to Imperior Contact Income	ed (light 1)	Driller John	eri (k.)	ungan selah	Ground Elevati	on (******)		Tota	l Drii	lled Depth
	Drilling 12P	Equipa T	ment 2014	obe	Drilling OF	Method T	Borebole Z		Date/Time Dril	lling Started	(م	Date	Tim	e Total Depth Reached
a men San .	Туре о	f Sampi	ing D	evice PCRO	i gradinarja sveti Listorija	E Was recovered to the con-	. S.	13 (1976)	Water Level (b	gs) 5		Fina	d 1	7/8
en in visit lyddigi'i	Sample Type	Hamm	er 	Sale (1 del)	Driving	Wt.	Doon		Hydrogeologist				-	by/Date
w. ,		n Desci	ription	(include i	Att mark Blook	eld logbook)	,, , ,, , ,, ,, ,, ,, ,, ,, ,, ,, ,, ,,		£C. Vt- [©] gr	45/6/	eri sala La giler	gine.	को भवेदा पर रहेका के प्रकार का स्वरूप है । उसे के किया है । इसे भवेदा पर रहेका के प्रकार का स्वरूप है । उसे के किया है ।
1998 - 1998 1998 - 1998 1999 - 1998	Depth	Recovery	Blow Counts		Include lit notation, I	hology, grai ninerology,	n size, sorti bedding, pl	cription ng, angulari asticity, den licable)	ty, Munsell colorsity, consistency	rname & = \ , etc., as ^d \ \ \ \	USCS Symbol	Lithology	Water Content	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
				Si Hu Oan	15m 5c, 1	ork a	Tray	pour	i, F-m	LUCO .			J	50% recover
	12 13			Sund POO) '7 7'	-m, fradze	m] 3m sh 2 , De	- yei ense	llowish b			**.	ท	0.0 ppm
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		<u>.</u>						Portla	nd, or
Project Name	= Fina	MCT	Project Nu	nber 182200	LTCCODE (IRPIMS)		Site ID		LPRCODE (IRPIMS)
Drilling Compa		100 mg/m	Driljer	and the second	Ground Elevation	.4.	Total D	Orilled Depth	41
Drilling Equipm	ent	Drilling	Method	Borehole Diameter	Date/Time Drilling Started		Date/T	ime Total Depth	Reached
Lopro	1	01	7	2"	8/10/00 080	6	8/	10/00	0900
Type of Sampli	ing Device	5		Test of Gar	Water Level (bgs) First 22.5		Final	21.5	9 , 20, 8, 8
Sample Hamme	ir .	. 1			Hydrogeologist MS0	2	Checke	ed by/Date	
Type Location Descri	iption (inclu	Drivin de sketch in	1 1 1	Drop :	JUI JUIN SO		l		
						1 = 1			····
Depth Interval Recovery	Blow Counts	duntain in	out idea	Description	<u></u>	USCS Symbol	Lithology	Content	Remarks
24	Blow	notation.	minerology,	n size, sorting, angular bedding, plasticity, de applicable)	ity, Munsell color name & nsity, consistency, etc., as	USCS	Lith	हैं (Include all :	sample types & depth, odor, apor measurements, etc.)
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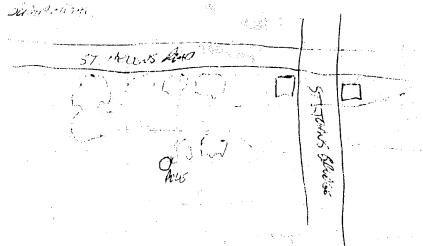
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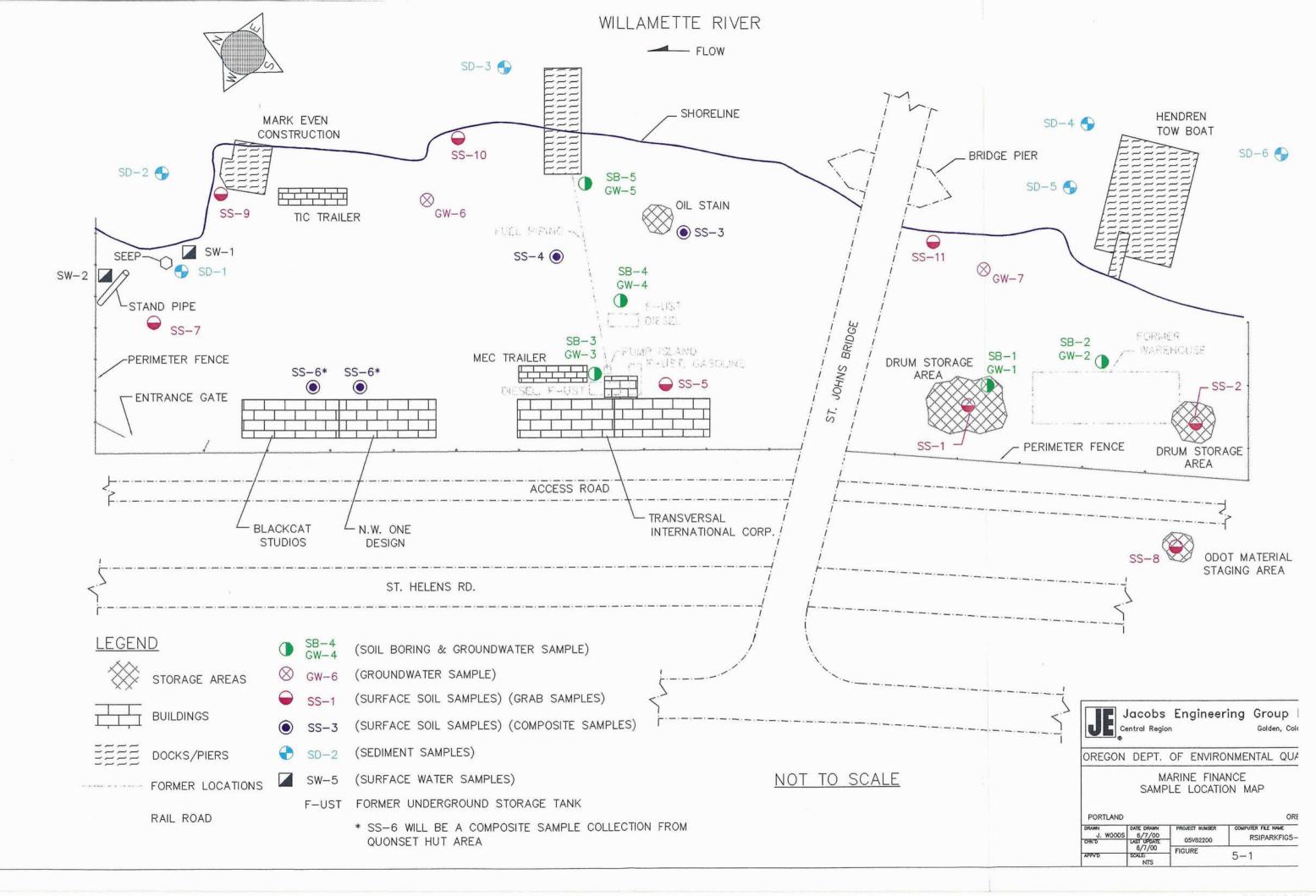
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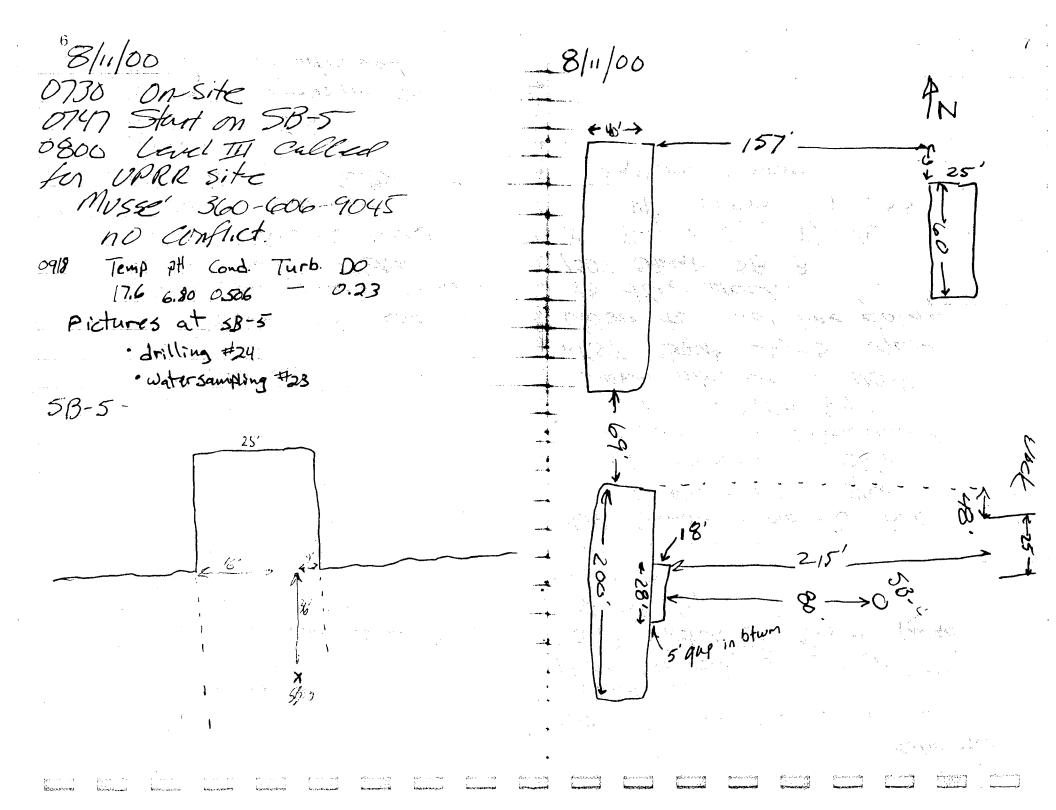
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8/10/00 7740 Meet Gotech -Driller John H&S Meeting and overious 2800 Move to 6W-6 0806 Start GW-6 2906 Purge Temp. Well T Ph conce Turb. Do 15.2 5.49 0.334 919 1.37 2947 1/20 Sampling Complete Decon 1000 Start GW-8797 '035 TO@ 24" purge - Sour than 6w-7 This point was simply driven to 24 695 with I dia well point 6w-6 was T pH cond Turb Do 16.2 6.85 0.336 - 2.86 1/21 Decon 1130 Start 5B-5A a 5B-5A 4ft interval

8/10/00 .1201 Picture - Surgere Leit . Collection .1230 SB-5Arefusal @ 12' . 1349 Picture @ 513-4 - purge . of SB-4 .40 Tale PA Cora Luch 100 0 . 173 all gall cap 254 . . 1408 Sample time for Hzo OR MOOD 402 8260 . OR-MOOG403 8270 @ 1345 Soil Collected from 20' NWTPH-DX . Sheen noticed on VOAs 1435 Start 5B-5 again . Closer to fuel line going . to the dock. . 1507 Start. 5B-3 . Then Temp pt could Turb Do 197 524 9313 604 4.53 13/git sheemon water

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Sample locations. Meet w/

Utilities Deeple:

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Olympic Pipeline company

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City - Sewer

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Locating Inc. about U.Swest
equipment & MF. He said

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1301 Spoke w. Gary Ticker
w/ QWEST - He indiented
100 conflict.
309 Called Tim @ MCI
(503) 849-124-4- unavailable
1320 Page Nick Smith w/
Sprint Phone # 274-214/
pager 833-8388

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APPENDIX D Analytical Data Results

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment PCBs in Sediments - August 2000

	- <u>- </u>			
Sample ID	OR-M001901	OR-M002101	OR-M002201	OR-M002203
Location	SD-1	SD-3	SD-4S	SD-4D
Date Sampled	09-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000
Time Sampled	1420	0955	1057	1515
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	78.5	46.0	56.4	60.4
Aroclor 1016	10 U	12 U	10 U	13 U
Aroclor 1221	20 U	16 U	20 U	20 U
Aroclor 1232	10 U	20 U	17 U	22 U
Aroclor 1242	10 U	16 U	10 U	10 U
Aroclor 1248	10 U	10 U	10 U	10 U
Aroclor 1254	10 U	10 U	10 U	10 U
Aroclor 1260	10 U	12	13	10
C 1D.	T 00	· · · · · · · · · · · · · · · · · · ·	·	Total
Sample ID	OR-M002301	OR-M002303	OR-M002401	OR-M002403
Location	SD-5S	SD-5D	SD-6S	SD-6D
Date Sampled	18-AUG-2000	18-AUG-2000	18-AUG-2000	18-AUG-2000
Time Sampled	1040	1542	1109	1445
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	49.1	52.2	42.6	50.3
				×
Aroclor 1016	10 U	13 U	10 U	10 U
Aroclor 1221	20 U	40 U	20 U	20 U
Aroclor 1232	18 U	60 U	10 U	10 U
Aroclor 1242	13 U	35 U	10 U	10 U
Aroclor 1248	16 U	10 U	10 U	10 U
Aroclor 1254	38 U	10 U	10 U	10 U
Aroclor 1260	19	76	8 J	10 U

J = Analyte was positively identified and quantitated above the method detection limit, but less than the required reporting limit

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Tributyltins in Soils - August 2000

Sample ID	OR-M000503	OR-M000803	OR-M000903	OR-M001403	OR-M001603	OR-M001702
Location	SB-5	SS-1	SS-2	SS-7	SS-9	SS-10
Date Sampled	11-AUG-2000	11-AUG-2000	11-AUG-2000	09-AUG-2000	10-AUG-2000	11-AUG-2000
Time Sampled	0852	0825	0925	1502	1030	1400
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	87.3	96.6	96.5	98.0	98.2	95.8
Tetra-n-butyltin	3 U	3 ∪	3 0	3 U	3 U	3 Ū
Tri-n-butyltin Cation	1 U	8	120	0.5 J	110	2
Di-n-butyltin Cation	8	2	15	0.4 J	29	0.5 J
n-butyltin Cation	2	3	12	1 U.	27	1 U

J - Analyte positively identified; value reported is greater than method detection limit, but below method reporting limit.

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment PCBs in Soils - August 2000

Sample ID	OR-M000102	OR-M000202	OR-M000302	OR-M000802	OR-M000902
Location	SB-1	SB-2	SB-3	SS-1	SS-2
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	11-AUG-2000	11-AUG-2000
Time Sampled	1130	1302	1511	0825	0925
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Percent Solids	89.2	91.4	89.3	96.3	96.3
					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Aroclor 1016	0.1 U	0.1,U	0.1 U	0.1 U	0.1 🔱
Aroclor 1221	0.2 U	0.2 U	0.2 U	0.2 U	0.2 Û
Aroclor 1232	0.1 U	0.1 U	0.1 U	0.1 U	0.1 🗓
Aroclor 1242	0.1 U	0.1 U	0.1 U	0.1 U	0-1 ปี
Aroclor 1248	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Aroclor 1254	0.1 U	0.1 U	0.1 U	0.1 U	0.1.0
Aroclor 1260	0.1 U	0.1 U	0.1 U	0.1 _. U	0.1 U
					Signal Si

			<u> </u>	* * * * * * * * * * * * * * * * * * * *	
Sample ID	OR-M001001	OR-M001101	OR-M001302	OR-M001502	ÓR-M001702
Location	SS-3	\$S-4	SS-6	SS-8	SS-10
Date Sampled	10-AUG-2000	10-AUG-2000	10-AUG-2000	10-AUG-2000	11-AUG-2000
Time Sampled	1420	1335	1550	1635	1400
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Percent Solids	95.0	94.9	96.7	94.3	95.84
Aroclor 1016	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Aroclor 1221	0.2 U	0.2 U	0.2 U	0.2 U	0.1 Ų
Aroclor 1232	0.1 U ,	0.1 U	0.1 U	0.1 U	0.1 U
Aroclor 1242	0.1 U	0.1 U	0.1 U	0.1 U	0.1 บ
Aroclor 1248	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Aroclor 1254	0.1 U	0.1 U	0.1 U	0.1 U	0.1 บ
Aroclor 1260	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment TPH in Waters - August 2000

Sample ID		OR-M000107	OR-M000207	OR-M000507
Location		GW-1	GW-2	GW-5
Date Sampled		11-AUG-2000	11-AUG-2000	11-AUG-2000
Time Sampled		1150	1422	0930
Units		μg/L	μg/L	μg/L
Percent Solids		NA	NA	NA
	1 12			
Gasoline Range Organics		NA	NA	NA
Diesel Range Organics		250 U	250 U	250 U
Residual Range Organics		500 U	500 U	500 U

NA - Not applicable/not analyzed.

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment TPH in Sediments - August 2000

Sample ID	OR-M001901	OR-M002001	OR-M002101	OR-M002201	OR-M002203
Location	SD-1	SD-2	SD-3	SD-4S	SD-4D
Date Sampled	09-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000
Time Sampled	1420	0910	0955	1057	1515
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Percent Solids	78.5	46.0	50.0	46.7	60.4
,			e e e e e e e e e e e e e e e e e e e		
Gasoline Range Organics	48 U	40 U	40 U	40 ∪	100 U
Diesel Range Organics	92	99 U	99	210	570
Residual Range Organics	640	400 U	380 U	410	730
					A COMPLETE SERVICES
Sample ID	OR-M002301	OR-M002303	OR-M002401	OR-M002403	
Location	SD-5S	SD-5D	SD-6S	SD-6D	ym vi 1900 no ybedanistych V 2006
Date Sampled	08-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000	
Time Sampled	1040	1542	1109	1445	
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	
Percent Solids	49.1	52.2	42.6	50.3	
				*	
Gasoline Range Organics	140 U	>40	40 U	20 U	
Diesel Range Organics	720	2,800	110 U	97 U	
Diesei Hange Organics	1 /20	_,000		,	1

> - NWTPH-Dx not quantitated; compound was detected by NWTPH-HCID; value is method repoting limit from NWTPH-HCID NA - Not applicable/not analyzed.

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment TPH in Soils - August 2000

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Sample ID	OR-M000102	OR-M000202	OR-M000302/3	OR-M000401	OR-M000502	OR-M000802	OR-M000902
Location	SB-1	SB-2	SB-3	SB-4	SB-5	SS-1	SS-2
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	10-AUG-2000	11-AUG-2000	11-AUG-2000	11-AUG-2000
Time Sampled	1130	1302	1541	1345	0852	0825	0925
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Percent Solids	89.2	91.4	89.3/94.4	57.7	87.9	96.3	96.3
						·	
Gasoline Range Organics	NA	NA	4.5 U	NA	NA	NA	NA
Diesel Range Organics	26 U	27	27 U	490	91	35	84
Residual Range Organics	110 U	. 100 U	. 110 U	1,100	260	98 U	250
was taken			Parker of the State of the Stat	1000 (1945년 2월 12일) 1 - 1721 (1945년 2월 12일) 2001 (1941년 12일)		and the state of t	
Sample ID	OR-M001001	OR-M001101	OR-M001202	OR-M001302	OR-M001402	OR-M001502	
Location	SS-3	PHSS-4	PHSS-5	SS-6	SS-7	SS-8	:
Date Sampled	10-AUG-2000	10-AUG-2000	10-AUG-2000	10-AUG-2000	09-AUG-2000	10-AUG-2000	
Time Sampled	1420	1335	1505	1550	1502	1635	
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	
Percent Solids	95.0	94.9	94.5	96.7	98.0	94.3	ette ar
			granda . Santa		No.		· ·
Gasoline Range Organics	,NA	NA	NA	NA	NA	NA	
Diesel Range Organics	230	220	28	1,400	62	26 U	
Residual Range Organics	260	110	110	9,800	380	100 U	

NA - Not applicable/not analyzed.

The second of th

U = Compound was analyzed for and not detected, value shown is method reporting limit:

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Metals in Waters - August 2000

Sample ID	OR-M000106	OR-M000206	OR-M000506	OR-M000603	OR-M000702	OR-M001905	OR-M002503
Location	GW-1	GW-2	GW-5	GW-6	GW-7	SW-1	SW-2
Date Sampled	11-AUG-2000	11-AUG-2000	11-AUG-2000	10-AUG-2000	10-AUG-2000	09-AUG-2000	09-AUG-2000
Time Sampled	1150	1414	0930	0930	1100	1400	1335
Units	<u>μ</u> g/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
Percent Solids	NA NA	NA	NA NA	NA	NA	NA	NA
		<u> </u>				्षर	2
Aluminum	33,200	13,700	13,300	10,400	9,840	42.2 B	30.0 U
Antimony	34.8 B	20.0 ∪	25.6 B	20 U	20 U	20 U	20.0 U
Arsenic	9.3	5.5	36.9	3.7 B	5.2	1.00 U	1.00 U
Barium	305	152	182	179	103	19.4	5.2
Beryllium	1.0 B	0.4 B	0.2 B	0.9 B	0.8 U	0.8 U	0.8 U
Cadmium	0.4 U	0.4 U	0.4 U	3 U	3 U	3.00 U	3.00 U
Calcium	39,100	29,400	47,200	30,000	29,000	14,700	14,700
Chromium	39,3	29.8	22.5	15.6	29.4	4.00 U	4.00 U
Cobalt	37.1	9.9 B	14.7	16.6	9.2 B	5.00 U	5.00 U
Copper	47.0	18.8	95.4	24.6	20.1	3.00 U	3.00 ∪
Iron	54,900	29,700	89,300	46,100	36,700	97.5	20.9
Lead	47.5	12.5	117	25.6	11.6	1.00 U	1.00 U
Magnesium	23,300	16,400	15,700	15,800	14,900	4,640	4,640
Manganese	773	682	3,160	1,500	¹ ∵1,630	16	4.3 B
Mercury	0.10 U	0.10 U	0.10 U	0.10 U	0.01 U	0.10 U	0.10 U
Nickel	51.0	20.5	19.3 B	21.3	26.2	∌ - 20.0 U	20.0 U
Potassium	3,700	3,080	3,320	2,310	2,600	2,000 U	2,000 _. U
Selenium	5.00 U	5.00 U	5.00 U	5 U	. 5 U	1.00 U	1.00 U
Silver	3.00 U	3.00 U	3.00 U	4 U	4 U	4.00 U	4.00 U
Sodium	10,300	9,510	10,100	12,200	9,310	7,450	5,720
Thailium	1.00 U	1.00 U	1.00 U	່ 1 ປຶ	1 U	1.00 U	1.00 U
Vanadium	146	75.5	56.0	53.3	44.8	4.9 B	4.00 U
Zinc	184	76.2	227	99.9	63.3	4.4 B	2.00 U

B = Element was positively identified and quantitated above the instrument reporting limit, but less than the required reporting limit

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U = Element was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Trace Metals in Sediments - August 2000

Sample ID	OR-M001902	OR-M002002	OR-M002102	OR-M002202	OR-M002204	OR-M002302	OR-M002304	OR-M002402	OR-M002404
Location	SD-1	SD-2	\$D-3	SD-4S	SD-4D	SD-5S	SD-5D	SD-6S	SD-6D
Date Sampled	09-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000
Time Sampled	1420	0910	0955	1057	1515	1040	1542	1109	1445
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	-, mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Percent Solids	70.8	47.6	46.7	52.8	64.4	46.7	65.0	44.9	64.7
		-				e e e e e e e e e e e e e e e e e e e			r ;
Aluminum	NA	NA	NA	. NA	NA	NA	NA	NA NA	NA
Antimony	0.20	0.17	1.87	0.65	0.19	0.62	0.56	0.14	0.16
Arsenic	3.7	4.3	11.1	4.9	3.8	5.8	3.6	4.6	3.7
Barium	· NA	NA	NA	NA	NA -	NA	NA A	NA	NA
Beryllium	0.42	0.49	0.53	0.49	0.43	0.59	0.41	0.55	0.45
Cadmium	0.38	0.23	0.26	0.32	0.17	0.30	0.43	0.21	0.15
Calcium	NA	NA ·	NA	NA	NA	NA	NA	NA	NA NA
Chromium	20.1	27.3	27.7	25.8 ⁻	24.3	33.1	23.1	27.1	22.9
Cobalt	NA	NA	NA	NA	NA	NA	. NA	NA	. NA
Copper	37.2	34.6	98.5	38.5	26.3	42.4	36.5	36.2	29.4
Iron	NA	NA	NA	NA	NA .	NA R	NA	NA NA	: NA
Lead	36.4	13.6	28.0	27.8	10.9	232	46.0	14.3	15.1
Magnesium	NA	NA	NA	NA	NA	NA NA	NA NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA NA	. NA	NA	NA
Mercury	0.02	0.06	0.09	0.07	0.07	0.11	0.18	0.08	0.14
Nickel	14.5	22.0	23.2	27.5	22.8	26.8	25.1	21.7	20.5
Potassium	. NA	NA	NA	NA .	NA	NA	NA	NA	, NA
Selenium	1.18 U	1.91 U	1.95 U	2.10 U	2.22 U	2.38 U	2.20 U	2.02 U	2.21 U
Silver	0.05	0.30	0.35	0.35	0.22	0.35	0.49	0.32	0.25
Sodium	NA	NA	NA	ŅĀ :	NA	NA	NA.	, NA	NA
Thallium	0.07	0.14	0.09	0.10	0.09	0.14	0.07	0.10	0.06
Vanadium	NA	NA	NA	NA	NA NA	NA	, NA ^{sta}	NA	NA.
Zinc	203	87.8	273	120	78.8	142	121	99.3	65.1

B = Element was positively identified and quantitated above the instrument reporting limit, but less than the required reporting limit.

NA - Not analyzed for using ultra-trace ICP/MS analytical method.

U = Element was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Metals in Soils - August 2000

Sample ID	OR-M000103	OR-M000203	OR-M000503	OR-M000803	OR-M000903	OR-M001002	OR-M001102
Location	SB-1	SB-2	SB-5	SS-1	SS-2	SS-3	SS-4
Date Sampled	11-AUG-2000	11-AUG-2000	11-AUG-2000	11-AUG-2000	11-AUG-2000	10-AUG-2000	10-AUG-2000
Time Sampled	1130	1302	0852	0825	0925	1420	1335
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Percent Solids	79.4	91.2	87.3	96.6	96.5	95.0	95.0
Aluminum	12,500	9,470	10,300	8,690	9,090	11,000	40.400
Antimony	4.20 U	4.39 U	4.58 U	6.1 B	9,090 8.1 B		13,400
Arsenic	3.1	3.2	3.3			5.7 B	7.6 B
Barium	111	74.6	86.6	3.3 99.7	7.3 115	3.8 131	5.0 129
Beryllium	0.3 B	0.3 B	0.3 В	0.3 В	0.3 в	0.4 B	0.3 B
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U	0.1 B	0.1 U	0.1 U
Calcium	4,420	3,890	4,100	5,100	5,160	4,890	5,710
Chromium	15.6	11.7	13.6	15.4	29.7	13.4	43.5
Cobalt	13.4	12.8	12.6	10.0	14.8	11.6	11.0
Copper	15.7	13.1	20.1	26.4	45.5	28.8	42.1
Iron	24,200	22,100	22,900	24,300	39,100	35,800	33,800
Lead	12.7 B	3.0 B	19.0 B	31.3	90.7	47.9	51.7
Magnesium	4,370	3,500	3,460	3,730	2,580	3,220	6,650
Manganese	316	273	386	459	621	547	507
Mercury	0.11	0.01 U	0.10	0.03	0.03	0.03	0.04
Nickel	20.0	16.4	17.1	12.3	17.8	14.6	27.5
Potassium	522	521	565	677	576	880	805
Selenium	1.1 B	0.2 U	1.2 B	0.5 U	1.0 B	0.5 U	0.5 U
Silver	0.8 U	0.9 U	0.9 U	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	437	293	304	268	263	320	583
Thallium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vanadium	65.2	56.5	60.4	70.6	96.7	92.0	79.6
Zinc	56.5	46.5	80.1	76.6	194	98.5	184

B = Element was positively identified and quantitated above the instrument reporting limit, but less than the required reporting limit

NA - Not analyzed for using ultra-trace ICP/MS analytical method.

U = Element was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Metals in Soils - August 2000

Sample ID	OR-M001202	OR-M001303	OR-M001403	OR-M001503	OR-M001603	OR-M001702	OR-M001802
Location	SS-5	SS-6	SS-7	SS-8	SS-9	SS-10	SS-11
Date Sampled	10-AUG-2000	10-AUG-2000	09-AUG-2000	10-AUG-2000	10-AUG-2000	11-AUG-2000	10-AUG-2000
Time Sampled	1505	1550	1502	1635	1036	1400	1155
Units	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry	mg/kg-dry
Percent Solids	94.5	96.8	98.0	94.2	98.2	95.8	97.6
·						e V (4)	
Aluminum	8,640	11,000	NA	5,280	9,890	10,500	10,900
Antimony	4.23 U	7.6 B	0.31	9.6 B	7.4 B	4.2 U	7.6 B
Arsenic	4.1	8.9	12.1	0.9 B	13.3	2.9	7.6
Barium	72.8	131	NA	43.9	137	112.0	113
Beryllium	0.2 B	0.3 B	0.23	0.1 B	0.2 B	0.3 B	0.3 B
Cadmium	0.1 U	0.1 U	0.16	0.1 U	0.1 U	0.1 U	0.5 B
Calcium	6,030	4,580	NA	4,150	15,200	4,460	5,120
Chromium	81.3	17.0	33.3	8.2	28.0	11.6	22.7
Cobalt	8.1	9.7	NA	16.3	11.1	15.5	11.7
Copper	52.6	46.0	24.2	12.8	270	19.2	48.2
Iron	25,800	30,300	NA	38,700	36,200	22,600	29,200
Lead	35.1	37.8	21.2	11.3 B	56.0	15.5	70.5
Magnesium	2,880	3,280	NA	1,470	3,810	3,560	3,080
Manganese	708	425	NA	470	543	481	430
Mercury	0.03	0.02	0.02 B	0.01 U	0.04	0.03	0.09
Nickel	31.6	15.0	18.5	7.7	16.9	13.8	31.8
Potassium	621	781	NA	545	856	563	716
Selenium	0.5 U	0.5 U	1.02 U	0.5 U	0.5 Ü	0.9 B	0.5 U
Silver	0.8 U	0.8 U	0.03	0.8 U	0.8 U	0.8 U	0.8 U
Sodium	377	376	NA	282	456	316.0	506
Thallium	0.2 U	0.2 U	0.07	0.2 U	0.2 U	0.2 U	0.2 บ
Vanadium	63.6	82.7	NA	134	68.0	80.4	91.9
Zinc	82.3	172	81.5	60.6	458	66.0	219

B = Element was positively identified and quantitated above the instrument reporting limit, but less than the required reporting limit

10/3/00 - 4:47 PM

NA - Not analyzed for using ultra-trace ICP/MS analytical method.

U = Element was analyzed for and not detected, value shown is method reporting limit.

Sample ID	OR-M000101	OR-M000201	OR-M003001	OR-M000501	OR-M000801
Location	SB-1	SB-2	SB-3	SB-5	. SS-1
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	11-AUG-2000	11-AUG-2000
Time Sampled	1130	1302	1541	0852	0825
Units	μg/kg-dry:	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	89.2	91.4	89.3	87.9	96.3
Tetrachloroethene (PCE)	8.0 U	6.5 U	10 U	6.6 U	5.9 U
Dibromochloromethane	8.0 U	6.5 U	. 10 U	6.6 U	5.9 U
1,2-Dibromometnane (EDB)	32 U	26 U	40 U	27_U	23 U
Chlorobenzene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
1,1,1,2-Tetrachloroethane	8.0 U	6.5 U	10 U	6.6 U	5.9 U
Ethylbenzene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
m,p-Xylenes	8.0 U	6.5 U	10 U	6.6 U	5.9 ป
o-Xylene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
Styrene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
Bromoform	8.0 U	6.5 U	- 10 U	6.6 U	5.9 U
Isopropylbenzene	32 U	26 U	40 U	27 U	23 U
1,1,2,2-Tetrachloroethane	8.0 U	6.5 U	10 U	6.6 U	5.9 U
1,2,3-Trichloropropane	8.0 U	√ 6.5 U	10 U	6.6 U	5.9 U
Bromobenzene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
n-Propylbenzene	32 U	26 U	40 U	27 U	23 U
2-Chlorotoluene	32 U	26 U	40 U	27 U	23 U
4-Chlorotoluene	32 U	26 U	40 U	27 U	23 U
1,2,3-Trimethylbenzene	32 U	26 U	40 U	27 U	23 U
tert-Butylbenzene	32 U	26 U	40 U	27 U	23 U
1,2,4-Trimethylbenzene	32 U	26 U	40 U	27 U	23 U
sec-Butylbenzene	32 U	26 U	40 U	27 U	23 U
1,3-Dichlorobenzene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
4-Isopropyltoluene	32 U	26 U	40 U	27 U	23 U
1,4-Dichlorobenzene	8.0 U	6.5 U	10 U	6.6 U	5.9 บ
n-Butylbenzene	32 U	26 U	40 U	27 U	23 ∪
1,2-Dichlorobenzene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
1,2-Dibromo-3-chloropropane	32 U	26 U	40 U	27 U	23 U
1,2,4-Trichlorobenzene	32 U	26 U	40 U	27 U	23 U
1,2,3-Trichlorobenzene	32 U	26 U	40 U	27 U	23 Ú
Naphthalene	32 U	26 U	40 U	27 U	23 _. U
Hexachlorobutadiene	32 U	26 U	40 U	27 U	. 23 U

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

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Sample ID	OR-M000101	OR-M000201	OR-M003001	OR-M000501	OR-M000801
Location	SB-1	SB-2	SB-3	SB-5	SS-1
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	11-AUG-2000	11-AUG-2000
Time Sampled	1130	1302	1541	0852	0825
Units, and an approprie	μg/kg-dry	µg/kg-dгу	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	89.2	91.4	89.3	87.9	96.3
Dichlorodifluoromethane	8.0 U	∈ e, 6.5 U	10 U	6.6 U	5.9 U
Chloromethane	8.0 U	6.5 U		6.6 U	5.9 U
Vinyl Chloride	8.0 U	6.5 U	1 3 54 10 U	6.6 U	5.9 U
Bromomethane	8.0 U	6.5 U	, 1. G A10 U	6.6 U	5.9 U
Chloroethane	8.0 U	6.5 U	10 U	6.6 U	_ 5.9 U
Trichlorofluoromethane	8.0 U	6.5 U	. 42 € # 10 U	6.6 U	5.9 U
Acetone	80 U	65 U	100 U	65 U	59 U
1,1-Dichloroethene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
Carbon Disulfide	8.0 U	6.5 U	: 10 U	. 6.6 บ	5:9 U
Methylene Chloride	16 U	13 U	20 U	13 U	12 ∪
trans-1,2-Dichloroethene	8.0 U	→ 6.5 U	10 U	6.6 U	5.9 U
1,1-Dichloroethane	8.0 U	6.5 U	10 U	6.6 U	5.9 U
2-Butanone (MEK)	32 U	26 U-	40 U	27 U	23 U
2,2-Dichloropropane	8.0 U	6.5 U	11 J 410 U	6.6 U	5.9 ∪
cis-1,2-Dichloroethene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
Chloroform	8.0 U	6.5 U	10 U	6.6 U	5.9 U
Bromochloromethane	8.0 U	6.5 U	10 U	6.6 U	· ∶ 5.9 Ư
1,1,1-Trichloroethane (TCA)	8.0 U	∞, 6.5 U	: 10 U	6.6 U	5.9 U
1,1-Dichloropropene	8.0 U	6.5 U	10 U	6.6 U	= 5.9 U
Carbon Tetrachloride	8.0 U	6.5 U	10 U	_ 6.6 U	5.9 U
1,2-Dichloroethane (EDC)	8.0 U	6.5 U	10 U	6.6 U	5:9 U
Benzene	8.0 U	6.5 U	10 U	6.6 ∪	5.9 U
Trichloroethene (TCE)	8.0 U	6.5 U	10 U	6.6 U	5.9 U
1,2-Dichloropropane	8.0 U	∂6.5 U	10 U	6.6 U	5.9. U
Bromodichloromethane	8.0 U	6.5 U	10 U	6.6 U	5.9 U
Dibromomethane	8.0 U	6.5 U	10 U	6.6 _. U	5.9 U
2-Hexanone	32 U	26 U	40 U	27 U	23 U
cis-1,3-Dichloropropene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
Toluene	8.0 U	6.5 ป	10 U	6.6 U	5.9 U
trans-1,3-Dichloropropene	8.0 U	6.5 U	10 U	6.6 U	5.9 U
1,1,2-Trichloroethane	8.0 U	6.5 U	10 U	6.6 U	5.9 U
4-Methyl-2-pentanone (MIBK)	32 U	26 U	40 U	27 U	23 U
1,3-Dichloropropane	8.0 U	6.5 U	10 U	6.6 U	5.9 U

Sample ID	OR-M000901	OR-M001301	OR-M001401	OR-M001501	OR-M001601	OR-M001703
Location	SS-2	SS-6	SS-7	\$S-8	SS-9	SS-10
Date Sampled	11-AUG-2000	10-AUG-2000	09-AUG-2000	10-AUG-2000	10-AUG-2000	11-AUG-2000
Time Sampled	0925	1550	1502	1635	1030	1400
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry :	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	96.3	96.7	98.0	94.3	98.2	95.7
Dichlorodifluoromethane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
Chloromethane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
Vinyl Chloride	6.0 U	5.5 U	7.1 U	6.1 U	7.3 ∪	5.8 U
Bromomethane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 ∪	5.8 Ü
Chloroethane	6.0 U	5.5 ∪	7.1 U	6.1 U	7.3 U	5.8 U
Trichlorofluoromethane	6.0 U	5.5 U	7.1 U	6.1 U	10	5.8 U
Acetone	60 U	66.0	71 U	61 U	73 U	58 U
1,1-Dichloroethene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
Carbon Disulfide	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
Methylene Chloride	12 U	-11 U	14 U	12 U	15 U	12 U
trans-1,2-Dichloroethene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
1,1-Dichloroethane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
2-Butanone (MEK)	24 U	22 U	28 U	24 U	29 U	23 U
2,2-Dichloropropane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
cis-1,2-Dichloroethene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
Chloroform	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
Bromochloromethane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
1,1,1-Trichloroethane (TCA)	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	
1,1-Dichloropropene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
Carbon Tetrachloride	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
1,2-Dichloroethane (EDC)	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
Benzene	6.0 U	5.5 U	7.1 U	6.1 U		
Trichloroethene (TCE)	6.0 U	5.5 U			7.3 U	5.8 U
1,2-Dichloropropane	6.0 U	5.5 U	7.1_U 7.1_U	6.1 U	7.3 U	5.8 U
Bromodichloromethane	6.0 U			6.1 U	7.3 U	5.8 U
Dibromomethane		5.5 U 5.5 U	-7.1 U	6.1 U	7.3 U	5.8 U
2-Hexanone	6.0 U 24 U	22 U	7.1 U 28 U	6.1 U	7.3 U	5.8 U
cis-1,3-Dichloropropene				24 U	29 U	23 U
Toluene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
trans-1,3-Dichloropropene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
1,1,2-Trichloroethane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
4-Methyl-2-pentanone (MIBK)	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 ∪
	2 <u>4 U</u>	22 U	28 U	24 U	29 U	23 ∪
1,3-Dichloropropane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U

Sample ID	OR-M000901	OR-M001301	OR-M001401	OR-M001501	OR-M001601	OR-M001703
Location	SS-2	SS-6	SS-7	\$\$-8	SS-9	SS-10
Date Sampled	11-AUG-2000	10-AUG-2000	09-AUG-2000	10-AUG-2000	10-AUG-2000	11-AUG-2000
Time Sampled	0925	1550	1502	1635	1030	1400
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	96.3	96.7	98.0	94.3	98.2	95.7
**************************************				<u> </u>		A stage of the later
Tetrachloroethene (PCE)	6.0 U	5.5 U	₹7.1 U	6.1 U	7.3 Ú	5.8 U
Dibromochloromethane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
1,2-Dibromometnane (EDB)	24 U	22 U	28 U	24 U	29 U	23 U
Chlorobenzene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 Ü
1,1,1,2-Tetrachloroethane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 ∪	5.8 Ú
Ethylbenzene 33	6.0 U	5.5 U	7.1 Ų	6.1 U	7.3 Ú	5.8 U
m,p-Xylenes	6.0 U	5.5 U	7:1 U	ੌ6.1 U	7.3 U	5.8 U
o-Xylene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
Styrene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 ∪	5.8 U
Bromoform	6.0 U	5.5 U	7.1 U	√ 6.1 U	7.3 U	5.8 U
Isopropylbenzene	24 U	22 U	28 U	24 U	29 U	23 Ù
1,1,2,2-Tetrachloroethane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
1,2,3-Trichloropropane	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
Bromobenzene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
n-Propylbenzene	24 U	22 U	28 U	24 U	29 U	23_U
2-Chlorotoluene	24 U	22 U	28 U	24 U	29 U	23 U
4-Chlorotoluene	24 U	22 U	28 U	24 U	29 U	23 U
1,2,3-Trimethylbenzene	24 U	22 U	28 U	24 U	29 U	23 U
tert-Butylbenzene	24 U	22 U	28_U	24 U	29 U	23 U
1,2,4-Trimethylbenzene	24 U	22 U	28 U	24 U	29 U	23 U
sec-Butylbenzene	24 U	22 U	28 U	24 U	29 U	23 U
1,3-Dichlorobenzene	6.0 ∪	5.5 U	7. <u>1</u> U	6.1 U	7.3 U	5.8 U
4-Isopropyltoluene	24 U	22 U	28 U	24 U	29 U	23 U
1,4-Dichlorobenzene	6.0 U	5.5 U	7.1 U	6.1 ป	7.3 U	5.8 U
n-Butylbenzene	24 U	22 U	28 U	24 U	29 U	23 U
1,2-Dichlorobenzene	6.0 U	5.5 U	7.1 U	6.1 U	7.3 U	5.8 U
1,2-Dibromo-3-chloropropane	24 U	22 U	28 U	24 U	29 U	23 U
1,2,4-Trichlorobenzene	24 U	22 U	28 U	24 U	29 U	23 U
1,2,3-Trichlorobenzene	24 U	22 U	28 U.	24 U	29 Ü	23 U
Naphthalene	24 U	22 U	28 U	24 U	29 U	23. U
Hexachlorobutadiene	24 U	22 U	28 U	24 U	29 U	23 ∪

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Sample ID	OR-M000104	OR-M000402	OR-M000504	OR-M000601	OR-M000701	OR-M001903	OR-M002501
Location	GW-1	GW-4	GW-5	GW-6	GW-7	SW-1	SW-2
Date Sampled	11-AUG-2000	10-AUG-2000	11-AUG-2000	10-AUG-2000	10-AUG-2000	09-AUG-2000	09-AUG-2000
Time Sampled	1150	1408	0930	0930	1100	1400	1335
Units	μg/Ľ	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
Percent Solids	NA /	NA	NA ·	NA	NA .	NA	NA .
Dichlorodifluoromethane	0.50 U	0.50 U	0.50 U	0.50 U	0:50 U	0.50 U	0.50 U
Chloromethane	0.50 U	0.50 0					
Vinyl Chloride	0.50 U						
Bromomethane	0.50 U						
Chloroethane	0.50 U	0:50°U	0.50 ป				
Trichlorofluoromethane	0.50 U	- 0.50 Ú					
Acetone	20 U						
1,1-Dichloroethene	0.50 U	0.50 ∪	0.50 U				
Carbon Disulfide	0.50 U	0.50 U	0.50 U	0.78	0.53	0.50 U	0.50 U
Methylene Chloride	1.0 U						
trans-1,2-Dichloroethene	0.50 U	0.50 ป	0.50.0				
1,1-Dichloroethane	0.50 U	ο.5ο υ					
2-Butanone (MEK)	20 U	20 ∪					
2,2-Dichloropropane	0.50 U	0.50 U	0.50 ป	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	0.50 U	0.50 บ					
Chloroform	0.50 U	0.50 U	0.50 บ	0.50 U	0.50 U	0.50 U	0.50 U
Bromochloromethane	0.50 U	0.50 ∪					
1,1,1-Trichloroethane (TCA)	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	0.50 U	0.50 Ü					
Carbon Tetrachloride	0.50 U						
1,2-Dichloroethane (EDC)	0.50 ∪	0.50 U					
Benzene	0.50 U						
Trichloroethene (TCE)	0.50 U	° 0.50 U⊳					
1,2-Dichloropropane	0.50 U	0.50 ⊍	0.50 U				
Bromodichloromethane	0.50 U						
Dibromomethane	0.50 U	0.50 บ	0.50 U	0.50 U	0.50 U	0.50 ∪	0.50 U
2-Hexanone	20 U	:20 ∪ "	20 U				
cis-1,3-Dichloropropene	0.50 U						
Toluene	0.50 U						
trans-1,3-Dichloropropene	0.50 ∪	0.50 U					
1,1,2-Trichloroethane	0.50 U						
4-Methyl-2-pentanone (MIBK)	20 U	20 U	20 U	20 U	20 U	20 U	20 U
1,3-Dichloropropane	0.50 U						

Sample ID	er might, min	OR-M000104	OR-M000402	OR-M000504	OR-M000601	OR-M000701	OR-M001903	OR-M002501
Location	1.27%	GW-1	GW-4	GW-5	GW-6	GW-7	SW-1	SW-2
Date Sampled		11-AUG-2000	10-AUG-2000	11-AUG-2000	10-AUG-2000	10-AUG-2000	09-AUG-2000	09-AUG-2000
Time Sampled	2.00	1150	1408	0930	0930	1100	1400	1335
Units	300 - Carana	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
Percent Solids	100 mm	NA .	NA :	NÄ	NA :	NA .	NA	NA.
		and the state of the state of		Language Tables of the Control of t				
Tetrachloroethene (PC	E)	∙0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloromethan	e	0.50 U	∴0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromometnane	(EDB)	2.0 U	2.0 U	[⊞] ्र र 2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chlorobenzene	14	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 ป
1,1,1,2-Tetrachloroet	hane	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m,p-Xylenes		0.50 U	0.50 U	∴ 0.50 U	0.50 U	0.50 U	0.50 U	0:50 U
o-Xylene		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 ⊍
Styrene		0.50 U	∂ 0.50 U	0.50 U	0.50 U	0.50 U	. 0.50 U	0:50 U
Bromoform		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Isopropylbenzene		2.0 U	2.0 U	2.0 U	2.0 ∪	2.0 U	2.0 U	2.0 ∪
1,1,2,2-Tetrachloroet	hane	0.50 U	0.50 ∪	3 0.50 U	0.50 U	0.50 U	0.50 U∵	0.50 ∪
1,2,3-Trichloropropan	e	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromobenzene		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
n-Propylbenzene		2.0 U	2.0 U	2.0 _. U	2.0 U	2.0 U	2.0 ປ∷	2.0 U
2-Chlorotoluene	1.0	2.0 U	2.0 U	2.0 U	2.0 ∪	2.0 ∪	2.0 U	2.0 U
4-Chlorotoluene	1:	2.0 U	2.0 U	2.0 ∪	2.0 U	2.0 ∪	2.0 ∪	2.0 U
1,2,3-Trimethylbenze	ne	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 ∪	% . 2.0 U
tert-Butylbenzene		2.0 U	2.0 U	2.0 U	2.0 ∪	2.0 U	2.0 ∪ ૽	2.0 ∪
1,2,4-Trimethylbenze	ne .	2.0 U	2.0 ∪	2.0 U		2.0 ∪	2.0 U	2.0 ∪
sec-Butylbenzene		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,3-Dichlorobenzene		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-Isopropyltoluene		2.0 U	2.0 U	2.0 ∪	2.0 U	2.0 ∪	2.0 U	2.0 U
1,4-Dichlorobenzene	1	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 ⊍.	0.50 U
n-Butylbenzene		2.0 U	2.0 U	2.0 U	2.0 U	2.0 ∪	2.0 0 0 0	2.0 ∪
1,2-Dichlorobenzene		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromo-3-chloro	propane	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 ∪
1,2,4-Trichlorobenzer	ne.	2.0 U	2.0 U	2.0 U	2.0 ∪	2.0 U	2.0°U	. 2.0 ∪
1,2,3-Trichlorobenzer	1e.	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 ∪
Naphthalene		2.0 ∪	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Hexachlorobutadiene		2.0 U	2.0 ∪	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Sample ID	OR-M000102	OR-M000202	OR-M003002	OR-M000502	OR-M000802
Location	SB-1	SB-2	SB-3	SB-5	SS-1
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	11-AUG-2000	11-AUG-2000
Time Sampled	1130	1302	1541	0852	0825
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	89.2	91.4	89.3	87.9	96.3
STATE OF THE PROPERTY OF THE		·			
N-Nitrosodiethylamine	2.0 ∪	2.0 U	2.0_∪	2.0 U	2.0 U
Aniline	1.0 U	1.0 U	0.99 U	0.98 U	0.98 U
bis(2-Chloroethyl)ether	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
Phenol	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
2-Chlorophenol	0.33 U	. 0.33 U	0.33 U	0.32 U	0.32 U
1,3-Dichlorobenzene	0.33 U	0.33 U	0.33 U	0.32 _. U	0.32 U
1,4-Dichlorobenzene	.0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
1,2-Dichlorobenzene	0.33 U	0.33 U	0.33 U	0.32 U	0.32 ປີ
Benzyl Alcohol	0.33 U	0.33 ป	0.33 U	0.32 U	0.32 ป
bis(2-Chloroisoproyl)ether	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
2-Methylphenol	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
Hexachloroethane	0.33 U	0.33 U	0.33 ป	0.32 ⊍	. 0.32 U
N-Nitroso-di-n-propylamine	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
3- and 4-Methylphenol	. 0.33 ∪	. , 0.33 U	0.33 U	0.32 ป	0.32 ∪
Nitrobenzene	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
Isophorone	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
2-Nitrophenol	0.33 U	0.33 U	0.33 U	0.32 U	0.32 Ü
2,4-Dimethylphenol	0.33 ∪	0.33 U	0.33 U	0.32 U	~ ′0.32 U
bis(2-chloroethoxy)methane	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
2,4-Dichlorophenol	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
Benzoic Acid	2.0 U	2.0 U	2.0 U	2.0 U	, 2.0 U
1,2,4-Trichlorobenzene	0.33 U	0,33 U	0.33 U	0.32 U	0.32 U
Naphthalene	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
4-Chloroaniline	0.33 ∪	0.33 U	0.33 U	0,32 U	0.33°U
Hexachlorobutadiene	0.33 บ	0.33 U	0.33 U	0.32 U	0.32 U
4-Chloro-3-methylphenol	0.33 U	0.33 U	0.33 U	0.32 U	0.33 U
2-Methylnaphthalene	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
Hexachlorocyclopentdiene	0.33 U	0.33 U	0.33 U	0.32 U	0.33 U
2,4,6-Trichlorophenol	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
2,4,5-Trichlorophenol	0.33 U	0.33 U	0.33 U	0.32 U	0.32 0
2-Chloronaphthalene	0.33 U	- 0.33 U	0.33 U	0.32 U	0.32 U
2-Nitroaniline	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Acenaphthylene	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
Dimethylphthalate	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
2,6-Dinitrotoluene	0.33 U	0.33 U	0.33 U	0.32 U	
Acenaphthene	0.33 U	0.33 U	0.33 U	0.32 U	0.33 U 0.32 U

Sample ID	OR-M000102	OR-M000202	OR-M003002	OR-M000502	OR-M000802
Location	SB-1	SB-2	SB-3	SB -5	SS-1
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	11-AUG-2000	11-AUG-2000
Time Sampled	1130	1302	1541	0852	0825
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	89.2	91.4	89.3	87.9	96.3
the same way to the property of the same o			- 		
3-Nitroaniline	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dinitrophenol	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibenzofuran	0:33 U	0.33 U	0.33 U	0.32 U	0.32 Ű
4-Nitrophenol		2.0 U	2.0 ∪	2.0 U	2:0 U
2,4-Dinitrotoluene	0.33 U	0.33 U	0.33 U	0.32 U	0.33 U
Fluorene	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
4-Chlorophenylphenyl ether	0.33 Ù	0.33 U	0.33 U	0.32 Ú	0.32 U
Diethylphthalate	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
4-Nitroaniline	∜8 2.0 U	2.0 U	2.0 U	2.0 U	2:0 U
2-Methyl-4,6-Dinitrophenol	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
N-Nitrosodiphenylamine	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
4-Bromophenylphenyl ether	0.33 U	0.33 U	0.33 U	0,32 U	0.32 U
Hexachlorobenzene	0.33 U	0.33 U	0.33 U	0.32 U	0.32 Ù
Pentachlorophenol	2.0 U	2.0 ∪	2.0 ∪	2.0 U	2.0 U
Phenanthrene	0.33 U	0.33 U	0.33 U	0.32 U	0.32 Ú
Anthrecene	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
Di-n-butylphthalate	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
Fluoranthene	0.33 U	0.33 U	0.33 U	0.32 U	0.32 U
Pyrene	0.36	0.33 U	0.33 U	3.2 U	0.32 Ú
Butylbenzylphthalate	0.33 U	0.33 U	0.33 U	3.2 U	0.32 ["] U
3,3'-Dichlorobenzidine	2.0 U	2.0 U	2.0 U	20 U	2,0 U
Benz(a)anthracene	0.33 U	0.33 U	0.33 U	3.2 U	0.32 U
Chrysene	0.33 U	0.33 U	0.33 U	3.2 U	0.32 U
bis(2-Ethylhexyl)phthalate	0.33 U	0.33 U	0.33 U	3.3 U	0.33 U
Di-n-octylphthalate	0.33 U	0.33 U	0.33 U	3.3 U	0.33 U
Benzo(b)fluoranthene	0.33 U	0.33 U	0.33 U	3.2 U	0.32 U
Benzo(k)fluoranthene	0.33 U	0.33 U	0.33 U	3.2 U	0,32 U
Benzo(a)pyrene	0.33 U	0.33 U	0.33 U	3.2 U	0.32 U
Indeno(1,2,3-cd)pyrene	0.33 U	0.33 U	0.33 U	3.2 U	0.32 U
Dibenz(a,h)anthracene	0.33 U	0.33 U	0.33 U	3.2 U	0.32 ∪
Benzo(g,h,i)perylene	0.33 U	0.33 U	0.33 U	3.2 U	0.32 U

 $[\]label{eq:U} U \,=\, \text{Compound was analyzed for and not detected,} \\ \text{value shown is method reporting limit.}$

Sample ID	OR-M000902	OR-M001001	OR-M001201	OR-M001302	OR-M001402
Location	\$S-2	SS-3	SS-5	SS-6	SS-7
Date Sampled	11-AUG-2000	10-AUG-2000	10-AUG-2000	10-AUG-2000	09-AUG-2000
Time Sampled	0925	1420	1505	1550	1502
Units	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	96.3	95.0	94.5	96.7	98.0
N-Nitrosodiethylamine	2.0 ∪	2.0 ∪	.1.9 ∪	2.0 ∪	NA
Aniline	1.0 U	0.98 U	0.95 U	1.0 ∪	NA NA
bis(2-Chloroethyl)ether	0.33 U	0.32 U	0.31 U	0.33 U	5.2 ∪
Phenol	0.33 U	0.32 U	₁ 0.31 U	0.33 U	5.2 U
2-Chlorophenol	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
1,3-Dichlorobenzene	0.33 U	0.32 U	0.31 U	0.33 U	5.2 ∪
1,4-Dichlorobenzene	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
1,2-Dichlorobenzene	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
Benzyl Alcohol	. 0.33 U	0.32 U	0.31 U	0.33 U	9.0
bis(2-Chloroisoproyl)ether	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
2-Methylphenol	0.33 U	0.32 U	0.31 U	0.33 U	30 U
Hexachloroethane	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
N-Nitroso-di-n-propylamine	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
3- and 4-Methylphenol	0.33 U	0.32 U	0,31 U	, 0.33 U	40 U
Nitrobenzene	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
Isophorone	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
2-Nitrophenol	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
2,4-Dimethylphenol	0.33 U	0.32 ⊍	0.31 U	0.33 U	40 U
bis(2-chloroethoxy)methane	0.33 U	0.32 U	0.31 U	0.33 U	5:2 U
2,4-Dichlorophenol	0.33 U	0.32 ∪	0.31 U	0.33 U	10 U
Benzoic Acid	2.0 U	2.0 ∪	1.9 U	2.0 U	210 U
1,2,4-Trichlorobenzene	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
Naphthalene	0.33 U	0.32 U	0.31 ป	0.33 U	3 J
4-Chloroaniline	0.33 ป	0.32 U	0.31 U	0.33 U	5.2 U
Hexachlorobutadiene	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
4-Chloro-3-methylphenol	0.33 U	0.32 U	₹0.31 U	0.33 U	30 U
2-Methylnaphthalene	. 0.33 U	0.32 U	0.31 U	0.33 U	3 J
Hexachlorocyclopentdiene	0.33 U	0.32 U	0.31 U	0.33 U	21 U
2,4,6-Trichlorophenol	0.33 U	0.32 U	0.31 U	0.33 U	8 U
2,4,5-Trichlorophenol	. 0.33 U	0.32 U	0.31 U	0.33 U	7 U
2-Chloronaphthalene	0.33 U	0.32 U	. 0.31 U	0.33 U	5.2 U
2-Nitroaniline	2.0 U	2.0 ∪	1.9 υ	2.0 U	5.2 U
Acenaphthylene	0.33 U	0.32 U	· 0.31 U	0.33 U	3 J
Dimethylphthalate	0.33 U	0.32 U	0.31 U	0.33 U	0.7 J
2,6-Dinitrotoluene	0.33 U	0.32 U	0.31 U	0.33 U	5.2 U
Acenaphthene	0.33 U	0.32 U	0.31 U	0.33 U	110

Sample ID	OR-M002301	OR-M002303	OR-M002401	OR-M002403
Location	SD-5S	SD-5D	SD-6S	SD-6De
Date Sampled	08-AUG-2000	08-AUG-2000	08-AUG-2000	08-AUG-2000
Time Sampled	1040	1542	1109	1445
Units and the second	μg/kg-dry	μg/kg-dry	μg/kg-dry	μg/kg-dry
Percent Solids	49.1	52.2	42.6	50.3
			·	
Dibenzofuran	200 J	1,200	6 J	2.0 U
2,4-Dinitrotoluene	2,100 U	1,600 U	49 U	20 Ü
4-Nitrophenol	4,200 U	500 J	98 U	20 U
Fluorene	1,700	13,000	35	2 J
4-Chlorophenylphenyl ether	420 U	320 U	9.8 U	2.0 U
Diethylphthalate	1,000 U	800 U	2 J	2.0 ∪
4 Nitroaniline	4,200 U	3,200 U	98 U	20 U
2-Methyl-4,6-Dinitrophenol	8,400 U	6,400 U	200 Ú	40 U
N-Nitrosodiphenylamine	420 U	320 U	9.8 U	4 U
4-Bromophenylphenyl ether	420 U	320 U	9.8 ∪	2.0 Ü
Hexachlorobenzene	420 U	320 U	9.8 ∪	2.0 ∪
Pentachlorophenol	13,000 U	9,600 U	290 U	59 U
Phenanthrene	16,000	99,000	150 J	16 J
Anthrecene	890	20,000	46 J	2.5 J
Carbazole	200 J	590	9.J.	2.0 U
Di-n-butylphthalate	840 U	640 U	20 U	4.0 U
Fluoranthene	18,000	82,000	210 J	360 J
Pyrene	24,000	110,000	240 J	450 J
Butylbenzylphthalate	840 U	100 J	4 J	4.0 U
Benz(a)anthracene	6,500	22,000	100	110
Chrysene	7,800	27,000	130	140
3,3'-Dichlorobenzidine	3,000 U	3,000 U	200 U	200 U
bis(2-Ethylhexyl)phthalate	20 0 J	200 J	90 J	2,000 U
Di-n-octylphthalate	8,400 U	6,400 U	200 U	40 U
Benzo(b)fluoranthene	6,900	20,000	130 J	130 J
Benzo(k)fluoranthene	2,500	6,400	44	60 J
Benzo(a)pyrene	7,400	24,000	130	130
Indeno(1,2,3-cd)pyrene	6,100	17,000	100	10 0 J
Dibenz(a,h)anthracene	500 J	1,500	20 J	6 J
Benzo(g,h,i)perylene	6,200	20,000	110	200 J

U = Compound was analyzed for and not detected, value shown is method reporting lim

J = Value reported is estimated. This is due to anaomalous quality control and/or the va reported is above the method detection loimit but below the method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Semivolatile Organic Compounds in Waters - August 2000

Sample(ID) 400 Aug 90094 a	OR-M000105	OR-M000205	OR-M000305	OR-M000403
Location	GW-1	GW-2	GW-3	GW-4
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	10-AUG-2000
Time Sampled	1150	1400	1614	1408
Units	μg/L	μg/L _i :	μg/L	μg/L
Percent Solids	NA .	NA	. NA	NA .
N-Nitrosodiethylamine	24 U	25 U	25 U	24 U
Aniline	24 U	25 U	25 U	24 U
bis(2-Chloroethyl)ether	9.5 U	9.8 U	9.9 U	/- 9.6 U∖
Phenol	9.5 U	9.8 U	9.9 ∪	9.6 U
2-Chlorophenol	9.5 U	9.8 U	9.9 ∪	9.6 U
1,3-Dichlorobenzene	√ 2, 9.5 U	√ 5 y 9.8 U	9.9 U	9.6 U
1,4-Dichlorobenzene	9.5 ∪	9.8 U	9.9 ∪	9.6 U
1,2-Dichlorobenzene	. 9,5 U	9.8 U	9.9 U	9.6 U
Benzyl Alcohol	9.5 U	9.8 U	9.9 U	∵ 14 9.6 %U∗
bis(2-Chloroisoproyl)ether	9.5 ∪	9.8 U	9.9 U	9.6 ∪
2-Methylphenol	9.5 ∪	9.8 U	9.9∀∪⊸	9.6 U
Hexachloroethane	9.5 U	9.8 U	9.9 ∪	9.6 U
N-Nitroso-di-n-propylamine	.9.5 ∪	9.8 U	9.9 U	9.6 U
3- and 4-Methylphenol	9.5 U	9.8 U	9.9 U	9.6 U
Nitrobenzene	9.5 U	9.8 U	9.9 U	9.6 U
Isophorone	9.5 U	9.8 U	9.9 U	9.6 U :
2-Nitrophenol	9.5 U	9.8 U	9.9 U	9.6 U
2,4-Dimethylphenol	9.5 ∪	9.8 U	9.9 U	9.6 U
bis(2-chloroethoxy)methane	9.5 U	9.8 U	9.9 U	9.6 U
2,4-Dichlorophenol	9.5 U	9.8 U	9.9 ∪	9.6 U
Benzoic Acid	24 U	25 U	25 U	. 24 U
1,2,4-Trichlorobenzene	9.5 U	9.8 U	9.9 U	9.6 U
Naphthalene	9.5 ∪	9.8 ∪	9.9 ∪	9.6 U
4-Chloroaniline	9.5 ∪	9.8 ∪	9.9 U	9.6 U
Hexachlorobutadiene	9.5 U	9.8 U	9.9 U	9.6 U
4-Chloro-3-methylphenol	9.5 U	9.8 U	9.9 ∪	9.6 U
2-Methylnaphthalene	9.5 ∪	9.8 ∪	9.9 ∪	9.6 ∪√
Hexachlorocyclopentdiene	9.5 U	9.8 U	9.9 U	9.6 U
2,4,6-Trichlorophenol	9.5 ∪	9.8 U	9.9 ∪	9.6 U
2,4,5-Trichlorophenol	9.5 ∪	9.8 ∪	9.9 U	9.6 U
2-Chloronaphthalene	9.5 ∪	9.8 U	9.9 U	9.6 U
2-Nitroaniline	24 U	25 U	25 U	24 U
Acenaphthylene	9.5 U	9.8 U	9.9 U	9.6 U
Dimethylphthalate	9.5 U	9.8 U	9.9 U	9.6 U
2,6-Dinitrotoluene	9.5 U	9.8 U	9.9 U	9.6 U
Acenaphthene	9.5 U	9.8 U	9.9 U	9.6 U

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Semivolatile Organic Compounds in Waters: August 2000

Sample ID, AC Log Complete Com-	OR-M000105	OR-M000205	OR-M000305	OR-M000403
Location	GW-1∺	GW-2	GW-3	GW-4
Date Sampled	11-AUG-2000	11-AUG-2000	10-AUG-2000	10-AUG-2000
Time Sampled	1150-	1400	1614	1408
Units :	μg/L	μg/L :	μg/L	μg/L 1946
Percent Solids	NA	NA	NA	NA NA
3-Nitroaniline	24 U	25 U	25 Û	24 U
2,4-Dinitrophenol	24 U	25 U	25 U	24 U
Dibenzofuran	9.5 U	9.8 U	9.9 0	9.6 U
4-Nitrophenol	24 U	25 U	25 U	24 U
2,4-Dinitrotoluene	, 9.5 U	9.8 U	9.9 U	9.6 U
Fluorene	9.5 U	9.8 U	9.9 ປ	9.6 U
4-Chlorophenylphenyl ether	9.5 U	9.8 U	9.9 0	9.6 U
Diethylphthalate	9.5 U	9.8 ∪	9.9 Ü	9.6 U
4-Nitroaniline	24 U	25 U	25 U	24 U
2-Methyl-4,6-Dinitrophenol	24 U	25 U	25 U	24 U
N-Nitrosodiphenylamine	9.5 U	9.8 ∪	9.9 U	9.6 U
4-Bromophenylphenyl ether	9.5 Ų	9.8 U	9.9 U	9 6 U
Hexachlorobenzene	9.5 U	່ ື9.8 ປ	9.9 U	9.6 U
Pentachlorophenol	24 U	25 U	25 U	24 U
Phenanthrene	9.5 U	9.8 U	9.9 ∪	18
Anthrecene	9.5 U	≕ ੰ9.8 U	9.9 U	9.6 U
Di-n-butylphthalate	9.5 U	9.8 U	9.9 U	9.6 U
Fluoranthene	9.5 U	9.8 ປ	9.9 U ^{rc}	27
Pyrene	9.5 U	9.8 U	9.9 U	26
Butylbenzylphthalate	9.5 U	9.8 U	9.9 U	9.6 U
3,3'-Dichlorobenzidine	24 U	25 U	25 U	24 U
Benz(a)anthracene	9.5 U	9.8 U	9.9 Ü	9.6 ∪
Chrysene	9.5 U	9.8 ∪	9.9 U	9.9
bis(2-Ethylhexyl)phthalate	9.5 U	9.8 U	9.9 U	9.6 U
Di-n-octylphthalate	9.5 U	∍9.8 U	9.9 Ú	9.6 U
Benzo(b)fluoranthene	9.5 U	9.8 U	9.9 Ú	9.6 U
Benzo(k)fluoranthene	9.5 U	9.8 ∪	9.9 U	9.6 U
Benzo(a)pyrene	9.5 U	9.8 U	9.9 U	13
Indeno(1,2,3-cd)pyrene	.9.5 U	9.8 U	9.9 ປ	11
Dibenz(a,h)anthracene	9.5 U	9.8 U	9.9 U	9.6 U
Benzo(g,h,i)perylene	9.5 ∪	9.8 ∪	9.9 U	14

U = Analyte was analyzed for and not detected, value shown is method reporting limit.

Oregon Department of Environmental Quality Marine Finance Expanded Preliminary Assessment Semivolatile Organic Compounds in Waters - August 2000

Sample ID	OR-M000505	OR-M000602	OR-M000702	OR-M001904	OR-M002502
Location	GW-5	GW-6	GW-7	SW-1	SW-2
Date Sampled	11-AUG-2000	10-AUG-2000	10-AUG-2000	09-AUG-2000	09-AUG-2000
Time Sampled	0930	0930	1100	1400	1325
Units	μg/L	μg/L	μg/L	μg/L	μg/L
Percent Solids	NA	NA ·	NA	NA	NA
		<u> </u>		a 7.1	
N-Nitrosodiethylamine	27 U	24 U	25 U	24 U	25 U
Aniline	27 U	24 U	25 U	24 U	25 U
bis(2-Chloroethyl)ether	11 U	9.5 ∪	10 U	9.6 U	9.9 ∪
Phenol	11 U	9.5 ∪	10 U	9.6 U	9.9 U
2-Chlorophenol	. 11 U	9.5 U	10 U	9.6 U	9.9 U
1,3-Dichlorobenzene	୍ୟ 11 U	9.5 U	10 U	9.6 U	9,9 Û
1,4-Dichlorobenzene	11 U	9.5 U	10 U	9.6 ∪	9.9 U
1,2-Dichlorobenzene	11 U	9.5 U	10 U	9.6 U	9.9 ∪
Benzyl Alcohol	11 U	9.5 U	10 U	9.6 U	9.9 Ü
bis(2-Chloroisoproyl)ether	11 U	9.5 U	10 U	9.6 U	9.9 U
2-Methylphenol	11 U	9.5 U	10 U	9.6 U	9.9 U
Hexachloroethane	11 U	9.5 <u>U</u>	10 U	9.6 U	
N-Nitroso-di-n-propylamine	11 U	9.5 U	10 U.	9. 6 U	9.9 ∪
3- and 4-Methylphenol	11 U	9.5 U	10 U	9.6 U	9.9·U
Nitrobenzene	11 U	9.5 U	10 U	9.6 U	9.9 ປ
Isophorone	11 U	9.5 U	10 U	9.6 U	9.9 ∪∴
2-Nitrophenol	11 υ	9.5 ∪	10 U	9.6 U	9.9 U
2,4-Dimethylphenol	11 U	9.5 U	10 U	9.6 U	9.9 ∪
bis(2-chloroethoxy)methane	11 U	9.5 U	10 U	9.6 U	9.9 U
2,4-Dichlorophenol	11 U	9.5 U	10 U	9.6 U	9.9 U
Benzoic Acid	27 U	24 U	25 U	24 U	25 U
1,2,4-Trichlorobenzene	11 U	9.5 U	10 U	9.6 U	9.9 U
Naphthalene	11 U	9.5 U	10 U	9.6 U	9.9 U
4-Chloroaniline	. 11 U	9.5 U	10 U	9.6 U	9.9 ∪
Hexachlorobutadiene	11 U	9.5 ∪	10 U	9.6 U	9.9 ∪
4-Chloro-3-methylphenol	11 U	9.5 U	10 U	9.6 U	9.9 ∪
2-Methylnaphthalene	11 U	9.5 U	10 U	9.6 U	9.9 U
Hexachlorocyclopentdiene	11 U	9.5 U	10 U	9.6 U	9.9 U
2,4,6-Trichlorophenol	11 U	9.5 U	10 U	9.6 U	9.9 U
2,4,5-Trichlorophenol	11 U	9.5 U	10 U	9.6 ∪	9.9 ∪
2-Chloronaphthalene	- 11 U	9.5 U	10 U	9.6 U	9.9 U
2-Nitroaniline	27 U	24 U	25 U	24 U	25 U
Acenaphthylene	11 U	9.5 ∪	10 U	9.6 U	9.9 U
Dimethylphthalate	11 U	9.5 U	10 U	9.6 U	9.9 U
2,6-Dinitrotoluene	11 U	9.5 ∪	10 U	9.6 U	9.9 U
Acenaphthene	11 ∪	9.5 U	10 U	9.6 U	9.9 U

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DATA QUALITY EVALUATION

No formal data validation was performed on the analytical data results. Laboratory results were verified as 100 percent complete, all samples submitted for analysis had reasonable results provided. With the exception of one polychlorinated biphenyl (PCB) repreparation and reanalysis in subsurface soil sample "PHSS-6", all samples were extracted and analyzed within EPA required holding times. The initial PCB extraction and analysis for sample PHSS-6 was performed within recommended holding times. The surrogate standard result was outside laboratory and EPA method control limits. Sample reextraction occurred one day beyond the EPA recommended 14-day holding time. No PCB compounds were detected in the initial or reextracted sample analyses.

A summary of data results is found in tables "4-1" through "4-13". All tables were compiled from hard copy data deliverables provided from chemical analyses conducted by the Columbia Analytical Services laboratory in Kelso, Washington. Laboratory analytical results were produced and organized by laboratory service request (LSR) numbers. LSR numbers reflect when the laboratory received a group of coolers containing samples. Laboratory data reports submitted to Jacobs were complied using the laboratory's contracted statement of work and Oregon DEQ data requirements. Raw data was collected and is available at the laboratory, but was not included or requested for any of the data reports submitted.

All laboratory data were produced such that formal validation is possible if complete raw data sets are requested. The data quality is consistent with legally defensible definitive (not screening level quality) data and can be evaluated for the data assessment elements of precision, accuracy, representativeness, comparability, and completeness (PARCC).

Precision was not thoroughly evaluated because raw data was not requested. The laboratory was required to perform analyses using contractor, method, and laboratory specified control limits. Precision for laboratory analytical data was measured by evaluating the relative percent difference (RPD) from matrix spike/matrix spike duplicate (MS/MSD) and/or laboratory control sample/laboratory control sample duplicate (LCS/LCSD) sample pairs. Where applicable, precision for MS/MSD and/or LCS/LCSD was evaluated specific to preparation batches within the SDGs.

Accuracy was not thoroughly evaluated because raw data was not requested. Accuracy for laboratory analytical data is measured by statistically evaluating the values determined from numerous QC samples. The responses evaluated are initial multi-point calibrations (ICAL) percent relative standard deviation (% RSD); continuing calibrations (CCAL) percent difference (% D) from the ICAL; the frequency and percent recovery (% R) of CCAL samples; and the % R of the LCS, LCSD, and surrogate standard (SS) samples. Also evaluated were the specific calibration response factors and retention times for each SVOC and VOC target and surrogate compound; the SVOC and VOC

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"tuning" compound responses; and any contamination found in the various kinds of blank samples. The laboratory monitored this element as demonstrated by the reextraction and reanalysis of PCB sample PHSS-6.

Representativeness was evaluated through examination of the COC forms, and verification that the requested analyses were performed according to documented methods.

COC was maintained for all samples, including satisfactory preservation and analysis within required holding times. Samples were acquired in accordance with the project-specific sampling and analysis plan (SAP). Samples were, therefore, representative of the three-dimensional locale stated in the SAP.

Comparability was evaluated through verification that standard USEPA or other documented methods were utilized and that project documentation was consistent. Comparability for this data was acceptable based on the use of standard methods and project consistent documentation.

Completeness was evaluated numerically by comparing the number of usable analytical results to the total number of analyses performed. All sample aliquots were collected, shipped for analysis, analyzed by the requested method, and reported with satisfactory quality control results. No sample results were unacceptable; thus, completeness was 100%.

MSOS RESULTS

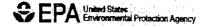
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APPENDIX E Comparison Criteria Sources



Waste Programs



Region 9 PRGs: Introduction

Region 9 Preliminary Remediation Goals (PRGs) are tools for evaluating and cleaning up contaminated sites. This page includes an explanation of the use of PRGs, key equations for computing PRGs and a table of PRG values.

Table of Contents:

Letter to PRG Table Mailing List Disclaimer Introduction Reading the PRG Table Using the PRG Table Technical Support Documentation References

Download the Preliminary Remediation Goals Table in Excel of Lotus 123 and Text in MS Word or WordPerfect. Another available resource is EPA's Soil Screening Guidance.

[R9 PRG Home] [Introduction] [R9 PRGs Table] [Soil PRGs] [Air-Water PRGs] [Toxicity Values] [Phys-Chem Data]

Letter to PRG Table Mailing List

October 1, 1999

Subject: Region 9 Preliminary Remediation Goals (PRGs) 1999

From: Stanford J. Smucker, Ph.D. Regional Toxicologist (SFD-8-B) Technical Support Team

To: PRG Table Mailing List

Please find the annual update to the Region 9 PRG (Preliminary Remediation Goals) table. Risk-based PRGs presented in the "lookup" table are useful tools for evaluating and cleaning up contaminated sites. They are being used to streamline and standardize all stages of the risk decision-making process. If you are not currently on the PRG table mailing list but would like to be, please call Lynn Trujillo (415.744.2419) or email her (Trujillo Dianna@epa.gov) and leave your name, address, and phone number.

EPA Region 9 has established a homepage for the PRGs on the World Wide Web which you can find at http://www.epa.gov/region09/waste/sfund/prg/. The PRG

http://www.epa.gov/region09/waste/sfund/prg/intro.htm

homepage presents additional information not available in the printed tables that are sent out to folks; including pathway-specific screening concentrations, non-cancer PRGs for carcinogenic substances, and physical-chemical information for volatile organic compounds (VOCs). This information may be viewed or downloaded at our website.

Region 9 risk-based PRGs are "evergreen" and have evolved as new methodologies and parameters have been developed. Changes to individual PRGs that have occurred from the 1998 table reflect either updates in toxicity information or a reclassification of a chemical's status as a VOC. These chemical-specific changes are identified by boldface type in the table. In addition, a more global change in the PRG numeric values reflects new exposure guidelines presented in "Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance" (USEPA 1999a, see Section 4.3).

Chemicals for which toxicity values have been revised or added include: acetonitrile, aluminum, antimony trioxide, chlordane, chlorobenzene, chloroethane, chloroform, chloromethane, chromium VI, dichlorobenzene isomers, ethyl chloride, manganese, nitroglycerin, 4-nitrophenol, PCBs, 1,1,2,2-tetrachloroethane, and tetrahydrofuran. Updates to EPA toxicity values were obtained from IRIS and the National Center for Environmental Assessment (NCEA) through August 1999.

Chemicals for which the VOC status has changed in an effort to reconcile differences among the regions include: chloronitrobenzene isomers, cyanogen and its salts, methylcyclohexane, methylene bromide, and the nitrotoluene isomers. The criteria for VOC status are taken from RAGS Part B. However, three "borderline chemicals" (dibromochloromethane, 1,2-dibromochloropropane, and pyrene) that do not strictly meet the RAGS criteria of volatility have also been included based upon discussions with other state and federal agencies and after a consideration of vapor pressure characteristics etc.

Before relying on any number in the table, it is recommended that the user verify the numbers with an agency toxicologist or risk assessor because the toxicity / exposure information in the table may contain errors or default assumptions that need to be refined based on further evaluation. If you find an error please send me a note via email at smucker.stan@epa.gov or fax at 415.744.1916.

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DISCLAIMER

Preliminary remediation goals (PRGs) focus on common exposure pathways and may not consider all exposure pathways encountered at CERCLA / RCRA sites (Exhibit 1-1). PRGs do not consider impact to groundwater or address ecological concerns. PRGs are specifically not intended as a (1) stand-alone decision-making tool, (2) as a substitute for EPA guidance for preparing baseline risk assessments, or (3) a rule to determine if a waste is hazardous under RCRA.

The guidance set out in this document is not final Agency action. It is not intended, nor can it be relied upon to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow

http://www.epa.gov/region09/waste/sfund/prg/intro.htm

09/20/2000

the guidance provided herein, or act at variance with the guidance, based on an analysis of specific circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

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1.0 INTRODUCTION

Region 9 Preliminary Remediation Goals (PRGs) are risk-based tools for evaluating and cleaning up contaminated sites. They are being used to streamline and standardize all stages of the risk decision-making process.

The Region 9 PRG table combines current EPA toxicity values with "standard" exposure factors to estimate contaminant concentrations in environmental media (soil, air, and water) that are considered protective of humans, including sensitive groups, over a lifetime. Chemical concentrations above these levels would not automatically designate a site as "dirty" or trigger a response action. However, exceeding a PRG suggests that further evaluation of the potential risks that may be posed by site contaminants is appropriate. Further evaluation may include additional sampling, consideration of ambient levels in the environment, or a reassessment of the assumptions contained in these screening-level estimates (e.g. appropriateness of route-to-route extrapolations, appropriateness of using chronic toxicity values to evaluate childhood exposures, appropriateness of generic exposure factors for a specific site etc.).

The PRG concentrations presented in the table can be used to screen pollutants in environmental media, trigger further investigation, and provide an initial cleanup goal if applicable. When considering PRGs as preliminary goals, residential concentrations should be used for maximum beneficial uses of a property. Industrial concentrations are included in the table as an alternative cleanup goal for soils. In general, it is not recommended that industrial PRGs be used for screening sites unless they are used in conjunction with residential values.

Before applying PRGs as screening tools or initial goals, the user of the table should consider whether the exposure pathways and exposure scenarios at the site are fully accounted for in the PRG calculation. Region 9 PRG concentrations are based on exposure pathways for which generally accepted methods, models, and assumptions have been developed (i.e. ingestion, dermal contact, and inhalation) for specific land-use conditions and do not consider impact to groundwater or ecological receptors (see Developing a Conceptual Site Model below).

EXHIBIT 1-1 TYPICAL EXPOSURE PATHWAYS BY MEDIUM FOR RESIDENTIAL AND INDUSTRIAL LAND USES^a

EXPOSURE PATHWAYS, ASSUMING:

MEDIUM

RESIDENTIAL LAND USE

INDUSTRIAL LAND USE

Ground Water	Ingestion from drinking	Ingestion from drinking
	Inhalation of volatiles	Inhalation of volatiles
	Dermal absorption from bathing	Dermal absorption
Surface Water	Ingestion from drinking	Ingestion from drinking
arian wasan w Maran wasan wa	Inhalation of volatiles	Inhalation of volatiles
in the second of	Dermal absorption from bathing	Dermal absorption
Adamir san da ka	Ingestion during swimming	
	Ingestion of contaminated fish	
Soil Soil	Ingestion	Ingestion
	Inhalation of particulates	Inhalation of particulates
Santono e e e e e e e e e e e e e e e e e e	Inhalation of volatiles	Inhalation of volatiles
	Exposure to indoor air from soil gas	Exposure to indoor air from soil gas
	Exposure to ground water contaminated by soil leachate	Exposure to ground water contaminated by soil leachate
	Ingestion via plant, meat, or dairy products	Inhalation of particulates from trucks and heavy equipment
	Dermal absorption	Dermal absorption
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Footnote:		5

^aExposure pathways considered in the PRG calculations are indicated in boldface italics.

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2.0 READING THE PRG TABLE

2.1 General Considerations

With the exceptions described below, PRGs are chemical concentrations that correspond to fixed levels of risk (i.e. either a one-in-one million $[10^{-6}]$ cancer risk or a noncarcinogenic hazard quotient of 1) in soil, air, and water. In most cases, where a substance causes both cancer and noncancer (systemic) effects, the 10⁻⁶ cancer risk will result in a more stringent criteria and consequently this value is presented in the

hard copy of the table. PRG concentrations that equate to a 10⁻⁶ cancer risk are indicated by "ca". PRG concentrations that equate to a hazard quotient of 1 for noncarcinogenic concerns are indicated by "nc".

If the risk-based concentrations are to be used for site screening, it is recommended that both cancer and noncancer-based PRGs be used. Both carcinogenic and noncarcinogenic values may be obtained at the Region 9 PRG homepage at:

http://www.epa.gov/region09/waste/sfund/prg/

It has come to my attention that some users have been multiplying the cancer PRG concentrations by 10 or 100 to set "action levels" for triggering remediation or to set less stringent cleanup levels for a specific site after considering non-risk-based factors such as ambient levels, detection limits, or technological feasibility. This risk management practice recognizes that there may be a range of values that may be "acceptable" for carcinogenic risk (EPA's risk management range is one-in-a-million [10⁻⁶] to one-in-ten thousand [10⁻⁴]). However, this practice could lead one to overlook serious noncancer health threats and it is strongly recommended that the user consult with a toxicologist or regional risk assessor before doing this. For carcinogens, I have indicated by asterisk ("ca*") in the PRG table where the noncancer PRGs would be exceeded if the cancer value that is displayed is multiplied by 100. Two stars ("ca**") indicate that the noncancer values would be exceeded if the cancer PRG were multiplied by 10. There is no range of "acceptable" noncarcinogenic "risk" so that under no circumstances should noncancer PRGs be multiplied by 10 or 100, when setting final cleanup criteria.

In general, PRG concentrations in the table are risk-based but for soil there are two important exceptions: (1) for several volatile chemicals, PRGs are based on the soil saturation equation ("sat") and (2) for relatively less toxic inorganic and semivolatile contaminants, a non-risk based "ceiling limit" concentration is given as 10⁺⁵ mg/kg ("max").

Also included in the PRG table are California EPA PRGs ("CAL-Modified PRGs") for specific chemicals where CAL-EPA screening values may be "significantly" more restrictive than the federal values; and, soil screening levels (SSLs) for protection of groundwater (see Section 2.3 below).

2.2 Toxicity Values

Heirarchy of Toxicity Values

EPA toxicity values, known as noncarcinogenic reference doses (RfD) and carcinogenic slope factors (SF) were obtained from IRIS, NCEA (formerly ECAO) through August 1999, and HEAST. The priority among sources of toxicological constants has changed since the last iteration of the table because the HEAST tables are no longer being updated. Therefore, the revised order of preference is as follows: (1) IRIS (indicated by "i"), (2) NCEA ("n"), (3) HEAST ("h"), (4) withdrawn from IRIS or HEAST and under review ("x") or obtained from other EPA documents ("o").

Inhalation Conversion Factors

As of January 1991, IRIS and NCEA databases no longer present RfDs or SFs for the inhalation route. These criteria have been replaced with reference concentrations

(RfC) for noncarcinogenic effects and unit risk factors (URF) for carcinogenic effects. However, for purposes of estimating risk and calculating risk-based concentrations, inhalation reference doses (RfDi) and inhalation slope factors (SFi) are preferred. This is not a problem for most chemicals because the inhalation toxicity criteria are easily converted. To calculate an RfDi from an RfC, the following equation and assumptions may be used for most chemicals:

RfDi
$$\frac{\text{mg}}{(\text{kg - day})} = \text{RfC}(\text{mg/m}^3) \times \frac{20\text{m}^3}{\text{day}} \times \frac{1}{70\text{kg}}$$

Likewise, to calculate an SFi from an inhalation URF, the following equation and assumptions may be used:

assumptions may be used:

$$SFi \frac{(kg - day)}{(mg)} = URF(m^3 / ug) \times \frac{day}{20m^3} \times 70kg \times \frac{10^3 ug}{mg}$$

Substances with New Toxicity Values

To help users rapidly identify substances with new toxicity values, these chemicals are printed in boldface type. This issue of the PRG table contains new or revised toxicity values for acetonitrile, aluminum, antimony trioxide, chlordane, chlorobenzene, chloroethane, chloroform, chloromethane, chromium VI, dichlorobenzene isomers, ethyl chloride, manganese, nitroglycerin, 4nitrophenol, PCBs, 1,1,2,2-tetrachloroethane, and tetrahydrofuran.

Route-to-Route Methods

Route-to-route extrapolations ("r") were frequently used when there were no toxicity values available for a given route of exposure. Oral cancer slope factors ("SFo") and reference doses ("RfDo") were used for both oral and inhaled exposures for organic compounds lacking inhalation values. Inhalation slope factors ("SFi") and inhalation reference doses ("RfDi") were used for both inhaled and oral exposures for organic compounds lacking oral values. Route extrapolations were not performed for inorganics due to portal of entry effects and known differences in absorption efficiency for the two routes of exposure.

An additional route extrapolation is the use of oral toxicity values for evaluating dermal exposures. For many chemicals, a scientifically defensible data base does not exist for making an adjustment of an oral slope factor/RfD to estimate a dermal toxicity value. Based on the current guidance (USEPA 1999a), the only chemical for which an adjustment is recommended is cadmium. An oral absorption efficiency of 5% is assumed for cadmium which leads to an estimated dermal reference dose (RfDd) of 2.5E-05. Please note that the 1999 PRG calculations for cadmium are based on this adjustment.

Although route-to-route methods are a useful screening procedure, the appropriateness of these default assumptions for specific contaminants should be verified by a toxicologist or regional risk assessor. Please note that whenever route-extrapolated values are used to calculate risk-based PRGs, additional uncertainties are introduced in the calculation.

2.3 Soil Screening Levels

Generic, soil screening levels (SSLs) for the protection of groundwater have been included in the PRG table for 100 of the most common contaminants at Superfund sites. Generic SSLs are derived using default values in standardized equations presented in *Soil Screening Guidance* (available from NTIS as document numbers PB96-963502 and PB96-963505 or EPA/540/R-95/128 and EPA/540/R-96/018).

The SSLs were developed using a default dilution-attenuation factor (DAF) of 20 to account for natural processes that reduce contaminant concentrations in the subsurface. Also included are generic SSLs that assume no dilution or attenuation between the source and the receptor well (i.e., a DAF of 1). These values can be used at sites where little or no dilution or attenuation of soil leachate concentrations is expected at a site (e.g., sites with shallow water tables, fractured media, karst topography, or source size greater than 30 acres).

In general, if an SSL is not exceeded for the migration to groundwater pathway, the user may eliminate this pathway from further investigation.

2.4 Miscellaneous

Volatile organic compounds (VOCs) are indicated by "1" in the VOC column of the table and in general, are defined as those chemicals having a Henry's Law constant greater than 10⁻⁵ (atm-m³/mol) and a molecular weight less than 200 g/mole). Three borderline chemicals (dibromochloromethane, 1,2-dibromochloropropane, and pyrene) which do not strictly meet these criteria of volatility have also been included based upon discussions with other state and federal agencies and after a consideration of vapor pressure characteristics etc. Volatile organic chemicals are evaluated for potential volatilization from soil/water to air using volatilization factors (see Section 4.1).

Chemical-specific dermal absorption values for contaminants in soil and dust are presented for arsenic, cadmium, chlordane, 2,4-D, DDT, lindane, TCDD, PAHs, PCBs, and pentachlorophenols as recommended in the "Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance" (USEPA 1999a). Otherwise, default skin absorption fractions are assumed to be 0.10 for nonvolatile organics. Please note that previous defaults of 0.01 and 0.10 for inorganics and VOCs respectively, have been withdrawn per new guidance.

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3.0 USING THE PRG TABLE

The decision to use PRGs at a site will be driven by the potential benefits of having generic risk-based concentrations in the absence of site-specific risk assessments. The original intended use of PRGs was to provide initial cleanup goals for individual chemicals given specific medium and land-use combinations (see RAGS Part B, 1991), however risk-based concentrations have several applications. They can also be used for:

• Setting health-based detection limits for chemicals of potential concern

- Screening sites to determine whether further evaluation is appropriate
- Calculating cumulative risks associated with multiple contaminants

A few basic procedures are recommended for using PRGs properly. These are briefly described below. Potential problems with the use of PRGs are also identified.

3.1 Developing a Conceptual Site Model

The primary condition for use of PRGs is that exposure pathways of concern and conditions at the site match those taken into account by the PRG framework. Thus, it is always necessary to develop a conceptual site model (CSM) to identify likely contaminant source areas, exposure pathways, and potential receptors. This information can be used to determine the applicability of PRGs at the site and the need for additional information. For those pathways not covered by PRGs, a risk assessment specific to these additional pathways may be necessary. Nonetheless, the PRG lookup values will still be useful in such situations for focusing further investigative efforts on the exposure pathways not addressed.

To develop a site-specific CSM, perform an extensive records search and compile existing data (e.g. available site sampling data, historical records, aerial photographs, and hydrogeologic information). Once this information is obtained, CSM worksheets such as those provided in ASTM's Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites (1995) can be used to tailor the generic worksheet model to a site-specific CSM. The final CSM diagram represents linkages among contaminant sources, release mechanisms, exposure pathways and routes and receptors. It summarizes our understanding of the contamination problem.

As a final check, the CSM should answer the following questions:

- Are there potential ecological concerns?
- Is there potential for land use other than those covered by the PRGs (that is, residential and industrial)?
- Are there other likely human exposure pathways that were not considered in development of the PRGs (e.g. impact to groundwater, local fish consumption, raising beef, dairy, or other livestock)?
- Are there unusual site conditions (e.g. large areas of contamination, high fugitive dust levels, potential for indoor air contamination)?

If any of these four conditions exist, the PRG may need to be adjusted to reflect this new information. Suggested references for evaluating pathways not currently evaluated by Region 9 PRG's are presented in Exhibit 3-1.

EXHIBIT 3-1
SUGGESTED READINGS FOR EVALUATING EXPOSURE
PATHWAYS NOT CURRENTLY ADDRESSED BY REGION 9 PRGs

http://www.epa.gov/region09/waste/sfund/prg/intro.htm

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EXPOSURE PATHWAY	REFERENCE
Migration of contaminants to an underlying potable aquifer	Soil Screening Guidance (USEPA 1996a, b), Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites (ASTM 1995)
Ingestion via plant uptake	Soil Screening Guidance (USEPA 1996a, b),
Ingestion via meat, dairy products, human milk	Estimating Exposure to Dioxin-Like Compounds (USEPA 1994a)
Inhalation of volatiles that have migrated into basements	User's Guide for Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings (USEPA 1997a)
Ecological pathways	Ecological Risk Assessment: Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, (USEPA 1997b), Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted
	Facilities (CAL-EPA 1996)

3.2 Background Levels Evaluation

A necessary step in determining the usefulness of Region 9 PRGs is the consideration of background contaminant concentrations. EPA may be concerned with two types of background at sites: naturally occurring and anthropogenic. Natural background is usually limited to metals whereas anthropogenic (i.e. human-made) "background" includes both organic and inorganic contaminants. Before embarking on an extensive sampling and analysis program to determine local background concentrations in the area, one should first compile existing data on the subject. Far too often there is pertinent information in the literature that gets ignored, resulting in needless expenditures of time and money.

Generally EPA does not clean up below natural background. In some cases, the predictive risk-based models generate PRG levels that lie within or even below typical background. If natural background concentrations are higher than the risk-based PRGs, an adjustment of the PRG is probably needed. Exhibit 3-2 presents summary statistics for selected elements in soils that have background levels that may exceed risk-based PRGs. An illustrative example of this is naturally occurring arsenic in soils which frequently is higher than the risk-based concentration set at a one-in-one-million cancer risk (the PRG for residential soils is 0.39 mg/kg). After considering background concentrations in a local area, EPA Region 9 has at times used the non-cancer PRG (22 mg/kg) to evaluate sites recognizing that this value tends to be above background levels yet still falls within the range of soil concentrations (0.39-39 mg/kg) that equates to EPA's "acceptable" cancer risk range of 10E-6 to 10E-4.

Where anthropogenic "background" levels exceed PRGs and EPA has determined that a response action is necessary and feasible, EPA's goal will be to develop a comprehensive response to the widespread contamination. This will often require coordination with different authorities that have jurisdiction over the sources of contamination in the area.

EXHIBIT 3-2 BACKGROUND CONCENTRATIONS OF SELECTED ELEMENTS IN SOILS

TRACE	U.	S. STUDY D	ATA1	CA	LIFORNIA	DATA ²
ELEMENT	Range	GeoMean	ArMean	Range	GeoMean	ArMean
Arsenic	< 1-97	5.2 mg/kg	7.2 mg/kg	0.59-11	2.75 mg/kg	3.54 mg/kg
Beryllium :	<1-15	0.63 "	0.92 "	0.10-2.7	1.14 "	1.28 "
Cadmium	<1-10		<1	0.05-1.7	0.26	0.36
Chromium	1-2000	37	.54	23-1579	76.25	122.08
Nickel	< 5-700	13 20 30	19	9.0-509	35.75	56.60

¹Shackle the and Hansford, "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States", USGS Professional Paper 1270, 1984.

²Bradford et. al, "Background Concentrations of Trace and Major Elements in California Soils", Kearney Foundation Special Report, UC-Riverside and CAL EPA DTSC, March 1996.

3.3 Screening Sites with Multiple Pollutants

A suggested stepwise approach for PRG-screening of sites with multiple pollutants is as follows:

- Perform an extensive records search and compile existing data.
- Identify site contaminants in the PRG table. Record the PRG concentrations for various media and note whether PRG is based on cancer risk (indicated by "ca") or noncancer hazard (indicated by "nc"). Segregate cancer PRGs from non-cancer PRGs and exclude (but don't eliminate) non-risk based PRGs ("sat" or "max").
- For cancer risk estimates, take the site-specific concentration (maximum or 95 UCL) and divide by the PRG concentrations that are designated for cancer evaluation ("ca"). Multiply this ratio by 10⁻⁶ to estimate chemical-specific risk for a reasonable maximum exposure (RME). For multiple pollutants, simply add the risk for each chemical:

$$Risk = [(\frac{conc_x}{PRG_x}) + (\frac{conc_y}{PRG_y}) + (\frac{conc_z}{PRG_z})] \times 10^6$$

• For non-cancer hazard estimates. Divide the concentration term by its respective non-cancer PRG designated as "nc" and sum the ratios for multiple contaminants. The cumulative ratio represents a non-carcinogenic hazard index (HI). A hazard index of 1 or less is generally considered "safe". A ratio greater than 1 suggests further evaluation. [Note that carcinogens may also have an associated non-cancer PRG that is not listed in the printed copy of the table sent to folks on the mailing list. To obtain these values, the user should view or download the PRG table at our website and display the appropriate sections.]

Hazard Index =
$$[(\frac{conc_x}{PRG_x}) + (\frac{conc_y}{PRG_y}) + (\frac{conc_x}{PRG_z})]$$

For more information on screening site risks, the reader should contact EPA Region 9's Technical Support Team.

3. 4 Potential Problems

As with any risk-based tool, the potential exists for misapplication. In most cases the root cause will be a lack of understanding of the intended use of Region 9 PRGs. In

order to prevent misuse of PRGs, the following should be avoided:

- Applying PRGs to a site without adequately developing a conceptual site model that identifies relevant exposure pathways and exposure scenarios,
- Not considering background concentrations when choosing PRGs as cleanup goals;
- Use of PRGs as cleanup levels without the nine-criteria analysis specified in the National Contingency Plan (or, comparable analysis for programs outside of Superfund),
- Use of PRGs as cleanup levels without verifying numbers with a toxicologist or regional risk assessor.
- Use of antiquated PRG tables that have been superseded by more recent publications,
- Not considering the effects of additivity when screening multiple chemicals, and
- Adjusting PRGs upward by factors of 10 or 100 without consulting a toxicologist or regional risk assessor.

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4.0 TECHNICAL SUPPORT DOCUMENTATION

Region 9 PRGs consider human exposure hazards to chemicals from contact with contaminated soils, air, and water. The emphasis of the PRG equations and technical discussion are aimed at developing screening criteria for soils, since this is an area where few standards exist. For air and water, additional reference concentrations or standards are available for many chemicals (e.g. MCLs, non-zero MCLGs, AWQC, and NAAQS) and consequently the discussion of these media are brief.

4.1 Soils - Direct Ingestion

Calculation of risk-based PRGs for direct ingestion of soil is based on methods presented in RAGS HHEM, Part B (USEPA 1991a) and *Soil Screening Guidance* (USEPA 1996a.b). Briefly, these methods backcalculate a soil concentration level from a target risk (for carcinogens) or hazard quotient (for noncarcinogens).

A number of studies have shown that inadvertent ingestion of soil is common among children 6 years old and younger (Calabrese et al. 1989, Davis et al. 1990, Van Wijnen et al. 1990). To take into account the higher soil intake rate for children, two different approaches are used to estimate PRGs, depending on whether the adverse health effect is cancer or some effect other than cancer.

For carcinogens, the method for calculating PRGs uses an age-adjusted soil ingestion factor that takes into account the difference in daily soil ingestion rates, body weights, and exposure duration for children from 1 to 6 years old and others from 7 to 31 years old. This health-protective approach is chosen to take into account the higher daily rates of soil ingestion in children as well as the longer duration of exposure that is anticipated for a long-term resident. For more on this method, see USEPA RAGs Part B (1991a).

For noncarcinogenic concerns, the more protective method of calculating a soil PRG is to evaluate childhood exposures separately from adult exposures. In other words, an age-adjustment factor is not applied as was done for carcinogens. This approach is considered conservative because it combines the higher 6-year exposure for children

with chronic toxicity criteria. In their analysis of the method, the Science Advisory Board (SAB) indicated that, for most chemicals, the approach may be overly protective. However, they noted that there are specific instances when the chronic RfD may be based on endpoints of toxicity that are specific to children (e.g. fluoride and nitrates) or when the dose-response is steep (i.e., the dosage difference between the no-observed-adverse-effects level [NOAEL] and an adverse effects level is small). Thus, for the purposes of screening, EPA Region 9 has adopted this approach for calculating soil PRGs for noncarcinogenic health concerns.

4.2 Soils - Vapor and Particulate Inhalation

Agency toxicity criteria indicate that risks from exposure to some chemicals via inhalation far outweigh the risk via ingestion; therefore soil PRGs have been designed to address this pathway as well. The models used to calculate PRGs for inhalation of volatiles/particulates are updates of risk assessment methods presented in RAGS Part B (USEPA 1991a) and are identical to the Soil Screening Guidance: User's Guide and Technical Background Document (USEPA 1996a,b).

To address the soil-to-air pathways the PRG calculations incorporate volatilization factors (VF_s) for volatile contaminants and particulate emission factors (PEF) for nonvolatile contaminants. These factors relate soil contaminant concentrations to air contaminant concentrations that may be inhaled on-site. The VF_s and PEF equations can be broken into two separate models: an emission model to estimate emissions of the contaminant from the soil and a dispersion model to simulate the dispersion of the contaminant in the atmosphere.

It should be noted that the box model in RAGS Part B has been replaced with a dispersion term (Q/C) derived from a modeling exercise using meteorological data from 29 locations across the United States because the box model may not be applicable to a broad range of site types and meteorology and does not utilize state-of-the-art techniques developed for regulatory dispersion modeling. The dispersion model for both volatiles and particulates is the AREA-ST, an updated version of the Office of Air Quality Planning and Standards. Industrial Source Complex Model, ISC2. However, different Q/C terms are used in the VF and PEF equations. Los Angeles was selected as the 90th percentile data set for volatiles and Minneapolis was selected as the 90th percentile data set for fugitive dusts (USEPA 1996 a,b). A default source size of 0.5 acres was chosen for the PRG calculations. This is consistent with the default exposure area over which Region 9 typically averages contaminant concentrations in soils. If unusual site conditions exist such that the area source is substantially larger than the default source size assumed here, an alternative Q/C could be applied (see USEPA 1996a,b).

Volatilization Factor for Soils

Volatile chemicals, defined as those chemicals having a Henry's Law constant greater than

 10^{-5} (atm-m³/mol) and a molecular weight less than 200 g/mole, were screened for inhalation exposures using a volatilization factor for soils (VF_s). Please note that VF_s's are available at our website.

The emission terms used in the VF_s are chemical-specific and were calculated from

physical-chemical information obtained from several sources. The priority of these sources were as follows: Soil Screening Guidance (USEPA 1996a,b), Superfund Chemical Data Matrix (USEPA 1996c), Fate and Exposure Data (Howard 1991), Subsurface Contamination Reference Guide (EPA 1990a), and Superfund Exposure Assessment Manual (SEAM, EPA 1988). In those cases where Diffusivity Coefficients (Di) were not provided in existing literature. Di's were calculated using Fuller's Method described in SEAM. A surrogate term was required for some chemicals that lacked physico-chemical information. In these cases, a proxy chemical of similar structure was used that may over- or under-estimate the PRG for soils.

Equation 4-9 forms the basis for deriving generic soil PRGs for the inhalation pathway. The following parameters in the standardized equation can be replaced with specific site data to develop a simple site-specific PRG

- Source area
- Average soil moisture content
- Average fraction organic carbon content
- Dry soil bulk density

The basic principle of the VF_s model (Henry's law) is applicable only if the soil contaminant concentration is at or below soil saturation "sat". Above the soil saturation limit, the model cannot predict an accurate VF-based PRG. How these particular cases are handled, depends on whether the contaminant is liquid or solid at ambient soil temperatures (see Section 4.5).

Particulate Emission Factor for Soils

Inhalation of chemicals adsorbed to respirable particles (PM $_{10}$) were assessed using a default PEF equal to 1. 316 x 10^9 m 3 /kg that relates the contaminant concentration in soil with the concentration of respirable particles in the air due to fugitive dust emissions from contaminated soils. The generic PEF was derived using default values in Equation 4-11, which corresponds to a receptor point concentration of approximately 0.76 ug/m 3 . The relationship is derived by Cowherd (1985) for a rapid assessment procedure applicable to a typical hazardous waste site where the surface contamination provides a relatively continuous and constant potential for emission over an extended period of time (e.g. years). This represents an annual average emission rate based on wind erosion that should be compared with chronic health criteria; it is not appropriate for evaluating the potential for more acute exposures.

The impact of the PEF on the resultant PRG concentration (that combines soil exposure pathways for ingestion, skin contact, and inhalation) can be assessed by accessing the Region 9 PRG website and viewing the pathway-specific soil concentrations. Equation 4-11 forms the basis for deriving a generic PEF for the inhalation pathway. For more details regarding specific parameters used in the PEF model, the reader is referred to *Soil Screening Guidance: Technical Background Document* (USEPA 1996a).

Note: the generic PEF evaluates windborne emissions and does not consider dust emissions from traffic or other forms of mechanical disturbance that could lead to greater emissions than assumed here.

4.3 Soils - Dermal Exposure

Dermal Contact Assumptions

Since the 1998 PRG table was issued, exposure factors for dermal contact with soil have changed in a few cases (USEPA 1999a). Recommended RME (reasonable maximum exposure) defaults for adult workers' skin surface areas (3300 cm²/day) and soil adherence factors (0.2 mg/cm²) now differ from the defaults recommended for adult residents (5700 cm²/day, 0.07 mg/cm²) as noted in Exhibit 4-1. This is due to differences in the range of activities experienced by workers versus residents.

Dermal Absorption

Chemical-specific skin absorption values recommended by the Superfund Dermal Workgroup were applied when available. Chemical-specific values are included for the following chemicals: arsenic, cadmium, chlordane, 2,4-D, DDT, lindane, TCDD, PAHs, PCBs, and pentachlorophenols.

The recently issued ARisk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance" (USEPA 1999a) recommends a default dermal absorption factor for semivolatile organic compounds of 10% as a screening method for the majority of SVOCs without dermal absorption factors. Default dermal absorption values for other chemicals (VOCs and inorganics) are not recommended in the new guidance. Therefore, the assumption of 1% for inorganics and 10% for volatiles is no longer included in the Region 9 PRG table. This change has minimal impact on the final risk-based calculations because human exposure to VOCs and inorganics in soils is generally driven by other pathways of exposure.

4.4 Soils - Migration to Groundwater

The methodology for calculating SSLs for the migration to groundwater was developed to identify chemical concentrations in soil that have the potential to contaminate groundwater. Migration of contaminants from soil to groundwater can be envisioned as a two-stage process: (1) release of contaminant in soil leachate and (2) transport of the contaminant through the underlying soil and aquifer to a receptor well. The SSL methodology considers both of these fate and transport mechanisms.

SSLs are backcalculated from acceptable ground water concentrations (i.e. nonzero MCLGs, MCLs, or risk-based PRGs). First, the acceptable groundwater concentration is multiplied by a dilution factor to obtain a target leachate concentration. For example, if the dilution factor is 10 and the acceptable ground water concentration is 0.05 mg/L, the target soil leachate concentration would be 0.5 mg/L. The partition equation (presented in the *Soil Screening Guidance* document) is then used to calculate the total soil concentration (i.e. SSL) corresponding to this soil leachate concentration.

The SSL methodology was designed for use during the early stages of a site evaluation when information about subsurface conditions may be limited. Because of this constraint, the methodology is based on conservative, simplifying assumptions about the release and transport of contaminants in the subsurface. For more on SSLs, and how to calculate site-specific SSLs versus generic SSLs presented in the PRG

http://www.epa.gov/region09/waste/sfund/prg/intro.htm

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table, the reader is referred to the Soil Screening Guidance document (USEPA 1996a,b).

4.5 Soil Saturation Limit

The soil saturation concentration "sat" corresponds to the contaminant concentration in soil at which the absorptive limits of the soil particles, the solubility limits of the soil pore water, and saturation of soil pore air have been reached. Above this concentration, the soil contaminant may be present in free phase, i.e., nonaqueous phase liquids (NAPLs) for contaminants that are liquid at ambient soil temperatures and pure solid phases for compounds that are solid at ambient soil temperatures.

Equation 4-10 is used to calculate "sat" for each volatile contaminant. As an update to RAGS HHEM, Part B (USEPA 1991a), this equation takes into account the amount of contaminant that is in the vapor phase in soil in addition to the amount dissolved in the soil's pore water and sorbed to soil particles.

Chemical-specific "sat" concentrations must be compared with each VF-based PRG because a basic principle of the PRG volatilization model is not applicable when free-phase contaminants are present. How these cases are handled depends on whether the contaminant is liquid or solid at ambient temperatures. Liquid contaminant that have a VF-based PRG that exceeds the "sat" concentration are set equal to "sat" whereas for solids (e.g., PAHs), soil screening decisions are based on the appropriate PRGs for other pathways of concern at the site (e.g., ingestion and dermal contact).

4.6 Ground Water/Surface Water - Ingestion and Inhalation

Calculation of PRGs for ingestion and inhalation of contaminants in domestic water is based on the methodology presented in RAGS HHEM, Part B (USEPA 1991a). Ingestion of drinking water is an appropriate pathway for all chemicals. For the purposes of this guidance, however, inhalation of volatile chemicals from water is considered routinely only for chemicals with a Henry's Law constant of 1 x 10^{-5} atm-m³/mole or greater and with a molecular weight of less than 200 g/mole.

For volatile chemicals, an upperbound volatilization constant (VF_w) is used that is based on all uses of household water (e.g showering, laundering, and dish washing). Certain assumptions were made. For example, it is assumed that the volume of water used in a residence for a family of four is 720 L/day, the volume of the dwelling is 150,000 L and the air exchange rate is 0.25 air changes/hour (Andelman in RAGS Part B). Furthermore, it is assumed that the average transfer efficiency weighted by water use is 50 percent (i.e. half of the concentration of each chemical in water will be transferred into air by all water uses). Note: the range of transfer efficiencies extends from 30% for toilets to 90% for dishwashers.

4.7 Default Exposure Factors

Default exposure factors were obtained primarily from RAGS Supplemental Guidance Standard Default *Exposure Factors* (OSWER Directive, 9285.6-03) dated March 25, 1991 and more recent information from U.S. EPA's Office of Solid Waste and Emergency Response, U.S. EPA's Office of Research and Development, and California EPA's Department of Toxic Substances Control (see Exhibit 4-1).

Because contact rates may be different for children and adults, carcinogenic risks during the first 30 years of life were calculated using age-adjusted factors ("adj").

Use of age-adjusted factors are especially important for soil ingestion exposures, which are higher during childhood and decrease with age. However, for purposes of combining exposures across pathways, additional age-adjusted factors are used for inhalation and dermal exposures. These factors approximate the integrated exposure from birth until age 30 combining contact rates, body weights, and exposure durations for two age groups - small children and adults. Age-adjusted factors were obtained from RAGS PART B or developed by analogy (see derivations next page).

one generally has referred to the For soils only, noncarcinogenic contaminants are evaluated in children separately from adults. No age-adjustment factor is used in this case. The focus on children is considered protective of the higher daily intake rates of soil by children and their lower body weight. For maintaining consistency when evaluating soils, dermal and inhalation exposures are also based on childhood contact rates.

(1) ingestion([mg-yr]/[kg-d];

$$IFS_{adj} = \frac{ED_c \times IRS_c}{BW_c} + \frac{(ED_r - ED_c) \times IRS_a}{BW_a}.$$

(2) skin contact([mg-yr]/[kg-d]:

$$SFS_{aa} = \frac{ED_c \times AF \times SA_c}{BW_c} + \frac{(ED_r - ED_c) \times AF \times SA_a}{BW_a}$$

(3) inhalation ($[m^3-yr]/[kg-d]$):

$$[S-yr]/[kg-d]$$
:
$$InhF_{adj} = \frac{ED_c \times IRA_c}{BW_c} + \frac{(ED_r - ED_c) \times IRA_a}{BW_a}$$

EXHIBIT 4-1 STANDARD DEFAULT FACTORS

	SIAMOAINE	DELA	BLITACIONS
Symb	pol Definition (units)	Default	Reference
CSF	Cancer slope factor oral (mg/kg-d)	·	IRIS, HEAST, or NCEA
CSFi	Cancer slope factor inhaled (mg/kg d)-1	_ [IRIS, HEAST, or NCEA
RfDo	Reference dose oral (mg/kg-d)		IRIS, HEAST, or NCEA
RfD			IRIS, HEAST, or NCEA
TR	Target cancer risk	10-6	·
THQ	Target hazard quotient	1	
BWa		70	RAGS (Part A), EPA 1989 (EPA/540/1-89/002)
BWc	Body weight, child (kg)	15	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
ATc	Averaging time - carcinogens (days)	25550	RAGS(Part A), EPA 1989 (EPA/540/1-89/002)
ATn	Averaging time - noncarcinogens (days)	ED*365	
SAa	Exposed surface area, adult (cm ² /day)		Dermal Assessment, EPA 1998 (EPA/540/R-99/005)
	- adult resident	5700	
	- adult worker	3300	
SAc	Exposed surface area, child (cm ² /day)	2800	Dermal Assessment, EPA 1999 (EPA/540/R-99/005)
AFa	Adherence factor, adult (mg/cm ²)		Dermal Assessment, EPA 1999 (EPA/540/R-99/005)

	*.** .	- adult resident - adult worker	0.07 0.2	angaran kerantahan di sebagai kerantahan berantahan berantahan berantahan berantahan berantahan berantahan ber Berantahan berantahan berantahan berantahan berantahan berantahan berantahan berantahan berantahan berantahan
	AFc	Adherence factor, child (mg/cm ²)	0.2	Dermal Assessment, EPA 1999 (EPA/540/R-99/005)
,	ABS	Skin absorption (unitless):		
		semi-volatile organics	0.1	Dermal Assessment, EPA 1999 (EPA/540/R-99/005)
	17-21	volatile organics		Dermal Assessment, EPA 1999 (EPA/540/R-99/005)
		inorganics	 .	Dermal Assessment, EPA 1999 (EPA/540/R-99/005)
	IRAa	Inhalation rate - adult (m ³ /day)	20	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
	IRAc	Inhalation rate - child (m3/day)	10	Exposure Factors, EPA 1997 (EPA/600/P-95/002Fa)
·	IRWa	Drinking water ingestion - adult (L/day)	2	RAGS(Part A), EPA 1989 (EPA/540/1-89/002)
, ,	IRWc	Drinking water ingestion - child (L/day)	1 (PEA, Cal-EPA (DTSC, 1994)
	IRSa	Soil ingestion - adult (mg/day)	100	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
	IRSc	Soil ingestion - child (mg/day),	200	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
	IRSo	Soil ingestion - occupational (mg/day)	50	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
	EFr	Exposure frequency - residential (d/y)	350	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
	EFo	Exposure frequency - occupational (d/y)	250	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
	EDr	Exposure duration - residential (years)	30 ^a	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
	EDc	Exposure duration - child (years)	6	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
	EDo	Exposure duration - occupational (years)	25	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
	-	Age-adjusted factors for carcinogens:		
	IFSadj	Ingestion factor, soils ([mg-yr]/[kg-d])	114	RAGS(Part B), EPA 1991 (OSWER No. 9285.7-01B)
	SFSadj	Dermal factor, soils ([mg-yr]/[kg-d])	361	By analogy to RAGS (Part B)
	InhFadj		11	By analogy to RAGS (Part B)
٠	IFWadj	Ingestion factor, water ([l-yr]/[kg-d])	1.1	By analogy to RAGS (Part B)
	VFw	Volatilization factor for water (L/m3)	0.5	RAGS(Part B), EPA 1991 (OSWER No. 9285.7-01B)
	PEF	Particulate emission factor (m3/kg)	See below	Soil Screening Guidance (EPA 1996a,b)
	VFs	Volatilization factor for soil (m3/kg)	See below	Soil Screening Guidance (EPA 1996a,b)
	sat	Soil saturation concentration (mg/kg)	See below	Soil Screening Guidance (EPA 1996a,b)

Footnote:

4.8 Standardized Equations

The equations used to calculate the PRGs for carcinogenic and noncarcinogenic

^aExposure duration for lifetime residents is assumed to be 30 years total. For carcinogens, exposures are combined for children (6 years) and adults (24 years).

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contaminants are presented in Equations 4-1 through 4-8. The PRG equations update RAGS Part B equations. The methodology backcalculates a soil, air, or water concentration level from a target risk (for carcinogens) or hazard quotient (for noncarcinogens). For completeness, the soil equations combine risks from ingestion, skin contact, and inhalation simultaneously. Note: the electronic version of the table also includes pathway-specific PRGs, should the user decide against combining specific exposure pathways; or, the user wants to identify the relative contribution of each pathway to exposure.

To calculate PRGs for volatile chemicals in soil, a chemical-specific volatilization factor is calculated per Equation 4-9. Because of its reliance on Henry's law, the VF model is applicable only when the contaminant concentration in soil is at or below saturation (i.e. there is no free-phase contaminant present). Soil saturation ("sat") corresponds to the contaminant concentration in soil at which the adsorptive limits of the soil particles and the solubility limits of the available soil moisture have been reached. Above this point, pure liquid-phase contaminant is expected in the soil. If the PRG calculated using VFs was greater than the calculated sat, the PRG was set equal to sat, in accordance with Soil Screening Guidance (USEPA 1996 a,b). The equation for deriving sat is presented in Equation 4-10.

PRG EQUATIONS

Soil Equations: For soils, equations were based on three exposure routes (ingestion, skin contact, and inhalation).

Equation 4-1: Combined Exposures to Carcinogenic Contaminants in Residential Soil

$$C(mg/kg) = \frac{TR \times AT_c}{EF_r \left[\left(\frac{IFS_{adj} \times CSF_o}{IO^6 mg/kg} \right) + \left(\frac{SFS_{adj} \times ABS \times CSF_o}{IO^6 mg/kg} \right) + \left(\frac{InhF_{adj} \times CSF_i}{VF_i^2} \right) \right]}$$

Equation 4-2: Combined Exposures to Noncarcinogenic Contaminants in Residential Soil

$$C(mg/kg) = \frac{THQ \times BW_c \times AT_n}{EF_r \times ED_c \left[\left(\frac{I}{RfD_o} \times \frac{IRS_c}{10^6 mg/kg} \right) + \left(\frac{I}{RfD_o} \times \frac{SA_c \times AF \times ABS}{10^6 mg/kg} \right) + \left(\frac{I}{RfD_i} \times \frac{IRA_c}{VF_s^4} \right) \right]}$$

Equation 4-3: Combined Exposures to Carcinogenic Contaminants in Industrial Soil.

$$C(mg/kg) = \frac{TR \times BW_a \times AT_c}{EF_o \times ED_o \left[\left(\frac{IRS_o \times CSF_o}{10^6 mg/kg} \right) + \left(\frac{SA_a \times AF \times ABS \times CSF_o}{10^6 mg/kg} \right) + \left(\frac{IRA_a \times CSF_i}{VF_i^a} \right) \right]}$$

Equation 4-4: Combined Exposures to Noncarcinogenic Contaminants in **Industrial Soil**

$$C(mg/kg) = \frac{THQ \times BW_{e} \times AT_{x}}{EF_{e} \times ED_{e}[(\frac{1}{RfD_{e}} \times \frac{IRS_{e}}{10^{6}mg/kg}) + (\frac{1}{RfD_{e}} \times \frac{SA_{e} \times AF \times ABS}{10^{6}mg/kg}) + (\frac{1}{RfD_{i}} \times \frac{IRA_{e}}{VF_{i}^{2}})]$$

Footnote:

^aUse VF_s for volatile chemicals (defined as having a Henry's Law Constant [atm-m³/mol] greater than 10⁻⁵ and a molecular weight less than 200 grams/mol) or PEF for non-volatile chemicals.

Tap Water Equations:

Equation 4-5: Ingestion and Inhalation Exposures to Carcinogenic Contaminants in Water

$$C(ug/L) = \frac{TR \times AT_c \times 1000ug/mg}{EF_r \left[(IFW_{adj} \times CSF_o) + (VF_w \times InhF_{adj} \times CSF_i) \right]}$$

Equation 4-6: Ingestion and Inhalation Exposures to Noncarcinogenic Contaminants in Water

$$C(ug/L) = \frac{THQ \times BW_a \times AT_n \times 1000ug/mg}{EF_r \times ED_r \left[\left(\frac{IRW_a}{RfD_o} \right) + \left(\frac{VF_w \times IRA_a}{RfD_i} \right) \right]}$$

Air Equations:

Equation 4-7: Inhalation Exposures to Carcinogenic Contaminants in Air

$$C(ug/m^3) = \frac{TR \times AT_c \times 1000ug/mg}{EF_r \times InhF_{aa} \times CSF_i}$$

Equation 4-8: Inhalation Exposures to Noncarcinogenic Contaminants in Air

$$C(ug / m^3) = \frac{THQ \times RfD_i \times BW_a \times AT_u \times 1000ug / mg}{EF_r \times ED_r \times IRA_a}$$

SOIL-TO-AIR VOLATILIZATION FACTOR (VF_s)

Equation 4-9: Derivation of the Volatilization Factor

$$VF_{s}(m^{3}/kg) = (Q/C) \times \frac{(3.14 \times D_{A} \times T)^{1/2}}{(2 \times \rho_{b} \times D_{A})} \times 10^{4} (m^{2}/cm^{2})$$

where:

$$D_{A} = \frac{\{(\Theta_{a}^{10/3}D_{i}H' + \Theta_{w}^{10/3}D_{w})/n^{2}\}}{\rho_{B}K_{d} + \Theta_{w} + \Theta_{a}H'}$$

	r Definition (units)	Default
VF _s	Volatilization factor (m ³ /kg)	 Set Set Set Set Set Set Set Set Set Set
D_{A}	Apparent diffusivity (cm ² /s)	🛥 i sa kabupunga bada 🗀
Q/C	Inverse of the mean conc. at the center of a 0.5-acre square source (g/m ² -s per kg/m ³)	68.81 open on Art 1
T	Exposure interval (s)	9.5 x 10 ⁸
rho _b	Dry soil bulk density (g/cm ³)	1.5
theta _a	Air filled soil porosity (L _{air} /L _{soil})	0.28 or n- w
n	Total soil porosity (L_{pore}/L_{soil})	0.43 or 1 - (b/s)
theta _w	Water-filled soil porosity (L _{water} /L _{soil})	
rho _s	Soil particle density (g/cm ³)	0.15 2.65
Di	Diffusivity in air (cm ² /s)	Chemical-specific
H	Henry's Law constant (atm-m³/mol)	Chemical-specific
H'	Dimensionless Henry's Law constant	Calculated from H by multiplying by 41 (USEPA 1991a)
$D_{\mathbf{w}}$	Diffusivity in water (cm ² /s).	Chemical-specific
K _d	Soil-water partition coefficient $(cm^3/g) = K_{oc}f_{oc}$	Chemical-specific
K _{oc}	Soil organic carbon-water partition coefficient (cm ³ /g)	Chemical-specific
f _{oc}	Fraction organic carbon in soil (g/g)	0.006 (0.6%)

SOIL SATURATION CONCENTRATION (sat)

Equation 4-10: Derivation of the Soil Saturation Limit

$$sat = \frac{S}{\rho_b} (K_d \rho_b + \Theta_w + H' \Theta_a)$$

Paramete	er Definition (units)	Default
sat	Soil saturation concentration (mg/kg)	in the second of
S	Solubility in water (mg/L-water)	Chemical-specific
rho_{b}	Dry soil bulk density (kg/L)	1.5
n	Total soil porosity (L _{pore} /L _{soil})	0.43 or 1 - (b/ s)
rho _s	Soil particle density (kg/L)	2.65
Kd	Soil-water partition coefficient (L/kg)	K _{oc} x f _{oc} (chemical-specific)
k _{oc}	Soil organic carbon/water partition coefficient (L/kg)	Chemical-specific
f_{oc}	Fraction organic carbon content of soil (g/g)	0.006 or site-specific
theta _w	Water-filled soil porosity (Lwater/Lsoil)	0.15
thetaa	Air filled soil porosity (Lair/Lsoil)	0.28 or n- w
w	Average soil moisture content (kg _{water} /kg _{soil} or L _{water} /kg _{soil})	0.1
H	Henry's Law constant (atm-m3/mol)	Chemical-specific
H'	Dimensionless Henry's Law constant	H x 41, where 41 is a units conversion factor

SOIL-TO-AIR PARTICULATE EMISSION FACTOR (PEF)

Equation 4-11: Derivation of the Particulate Emission Factor

$$PEF(m^3/kg) = Q/Cx \frac{3600s/h}{0.036 \times (l-V) \times (U_m/U_t)^3 \times F(x)}$$

Parameter Definition (units)		Default
PEF	Particulate emission factor (m3/kg)	1. 316 x 10 ⁹
Q/C	Inverse of the mean concentration at the center of a 0.5-acre-square source (g/m2-s per kg/m3)	90.80
V	Fraction of vegetative cover (unitless)	0.5
Um	Mean annual windspeed (m/s)	4.69
Ut	Equivalent threshold value of windspeed at 7 m (m/s)	11.32
F(x)	Function dependent on Um/Ut derived using Cowherd (1985) (unitless)	0.194
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URL: http://www.epa.gov/region09/waste/sfund/prg/intro.htm

Key. I=IRIS_n=NCEA_h=HEAST_x=WTHDRAWN_o=Other EPA DOCUMENTS_r=ROUTE_EXTRAPOLATION_ca=CANCER_PRG_nc=NONCANCER_PRG_sat=SOIL_SATURATION_max=CEILING_LIMIT_*(where: nc < 100X_ca)_**(where: nc < 10X_ca)_**(where: FOR PLANNING PURPOSES TOXICITY INFORMATION CONTAMINANT PRELIMINARY REMEDIATION GOALS (PRGS) Residential ... SEn × SFi O abs CAS No. PfDo * R(D) Soil (mg/kg) Soil (mg/kg). 5.6E+01 ca** 2.8E+02 ca* (mg/kg-d) ' (ug/m^3) 7.7E-01 l/(mg/kg-d) C soils 1/(mg/kg-d) (mg/kg-d) 8 7F-03 4.0E-03 8.7E-03 4.0E-03 0.10 30560-19-1 Acephate ca* r 0 Acetaldehyde 1.1E+01 car 2.3E+01 ca** 8.7E-01 1.7E+00 2.6E-03 75-07-0 1.8E+04 Acetochlor nc 7.3E+01 7.3E+02 2.0E-02 r O 0.10 34256-82-1 8E-01 Acetone 2E+01 1.0E-01 1.0E-01 67-64-1 Acetone cyanohydrin 4.9E+01 8 0E-04 8 0E-04 r O 75-86-5 75-05-8 Acetonitrile 2.7E+02 6.2E+01 7.9E+01 6 0F-03 1.7E-02 Acetophenone nc nc 1.0E-01 5.7E-06 98-86-2 Acifluorfen 4.4E+00 ca 2.2E+01 6.1E-02 6.1E-01 1.1E-01 1.3E-02 1.3E-02 r 0 0.10 50594-66-6 1.0E-01 3.4E-01 2.1E-02 4.2E-02 Acrolein nc nc 2.0E-02 5.7E-06 107-02-8 Acrylamide 1.1E-01 1.5E-02 4.6E+00 2.0E-04 2.0E-04 0.10 79-06-1 r 0 1.0E+05 1.0E+00 1.8E+04 79-10-7 Acrylic acid 2.9E+04 max nc 5.0F-01 2 9F-04 i 0 0 10 3.9E-02 2.8E-02 5.4F-01 1.0E-03 5.7E-04 107-13-1 Acrylonitrile 2.1E-01 5.1E-01 ca* h 2.4F-01 Alachlor 6.0E+00 8.4E-01 8.1E-02 h i 8.0E-02 1.0E-02 1.0E-02 0.10 15972-60-8 Alar 9.2E+03 1.0E+05 5.5E+02 5.5E+03 1.5E-01 1.5E-01 r 0 0.10 1596-84-5 Aldicarb 6.1E+01 8.8E+02 3.7E+00 3.6E+01 1.0E-03 1.0E-03 0.10 116-06-3 пс Aldicarb sulfone 1.0E-03 1.0E-03 r 0 0.10 1646-88-4 1.2E+04 6E+02 Aldrin 3.9E-04 3.0E-05 3.0E-05 309-00-2 ca 1.7E+01 i i 1.7E+01 r 0 0.10 Allv max 9.1E+02 2.5F-01 2.5E-01 r 0 010 5585-64-8 Allyl alcohol nc 5.0E-03 107-18-6 5.0E-03 r 0 010 nc 1.8E+03 Allyl chloride 3.0E+03 nc 4.3E+04 nc 1.0E+00 5.0E-02 2.9E-04 i 0 0.10 107-05-1 nc 7.6E+04 5.1E+00 3.6E+04 Aluminum 1.0E+05 1.0E+00 1.4E-03 n 0 7429-90-5 max nc Aluminum phosphide 3.1E+01 4.0E-04 0 20859-73-8 nc 1.8E+01 nc 2.6E+02 .1.1E+01 67485-29-4 Amdro nc 1.1E+00 nc 3 0F-04 3 0F-04 r 0 010 5.5E+02 7.9E+03 nc 3.3E+01 3.3E+02 Ametryn 9.0F-03 9.0F-03 r 0 0 10 834-12-8 591-27-5 m-Aminophenol 4.3E+03 7.0E-02 7.0E-02 r 0 0.10 1.2E+00 nc 1.8E+01 nc 7.3E-02 4-Aminopyridine 2.0E-05 2.0E-05 r 0 0.10 504-24-5 nc 1.5E+02 nc 2.2E+03 9.1E+01 nc 9.1E+00 2.5E-03 r 0 0.10 33089-61-1 Amitraz nc 2.5E-03 2.9E-02 7664-41-7 Ammonia 1.0E+02 Ammonium sulfamate nc 1.0E+05 7.3E+03 7773-06-0 2.0E-01 0 0 10 max 8.5E+01 ca** 4.3E+02 1.2E+01 Aniline 62-53-3 ca* 5.7E-03 7.0E-03 5.7E+03 2 9F-04 i 0 0.10 Antimony and compounds 3.1E+01 nc 8,2E+02 1.5E+01 4.0E-04 7440-36-0 5.0E+00 3E-01 Antimony pentoxide 3.9E+01 1.8E+01 1314-60-9 nc 1.0E+03 5.0E-04 n nc 1.8E+03 3.3E+01 Antimony potassium tartrate 7.0E+01 9.0E-04 28300-74-5 4 0F-04 1332-81-6 Antimony tetroxide 3.1E+01 1.5E+01 Antimony trioxide 3.1E+01 8.2E+02 nc 2.1E-01 1.5E+01 1309-64-4 4 OF-04 5.7E-05 i 0 nc 4.7E+01 Apollo 7.9E+02 nc 1.1E+04 nc 4.7E+02 74115-24-5 nc 1.3E-02 1.3E-02 r 0 0.10 ca 9.9E+01 2.5E-02 5.0E-02 0.10 140-57-8 Aramite DAG WE Arsenic (noncancer endpoint) 2.2E+01 nc 4.4E+02 3.0E-04 0 0.03 7440-38-2 3.9E-01 1E+00 ca* 2.7E+00 ca 4.5E-02 0.03 7440-38-2 Arsenic (cancer endpoint) 4.5E-04 2.9E+01 1.5E+00 3 0F-04 1.5E+01 Arsine (see arsenic for cancer endpoint) 1.4E-05 7784-42-1 5.2E-02 Assure nc 7.9E+03 3.3E+01 nc 3.3E+02 76578-12-6 9.0E-03 9.0E-03 r 0 0.10 Asulam 3.1E+03 nc 4.4E+04 1.8E+02 1.8E+03 5.0E-02 5.0E-02 r O 0:10 3337-71-1 Atrazine 3.5E-02 h 2.2E-01 3.5E-02 r O 0.10 1912-24-9 Avermectin B1 2.4E+01 nc 3.5E+02 1.5E+00 1.5E+01 4.0E-04 4.0E-04 r 0 0.10 71751-41-2 nc 2.2E+01 Azobenzene 4.4E+00 6.2E-02 6.1E-01 1.1E-01 i 1.1E-01 0 0.10 103-33-3

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5.4F+03

2.4E+02

1.8E+03 nc

DC.

1.0E+05

3.5E+03

2.6E+04

max

5.2F-01

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	35 25 30 450 52 C	Maddistrict Co.						and the state of t
	TOXICITY	INFORMA	TION		skin		CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs). SOIL SCREENING LEVEL Migration to Ground W
SFo	RfDo	SFi	RíDi		SKIII abs	CAS No.		Residential Industrial Ambient Air Tap Water DAF 201 DAF
(mg/kg-d)	(mg/kg-d)	1/(mg/kg-d)	(mg/kg-d)	⊸, Ĉ	 11500 67511000 			
	2.5E-02	i	2.5E-02	r 0	0.10	68359-37-5	Baythroid	1.5E+03 nc 2.2E+04 nc 9.1E+01 nc 9.1E+02 nc
	3.0E-01	i	3.0E-01	r 0	0.10	1861-40-1	Benefin	1.8E+04 nc 1.0E+05 max 1.1E+03 nc 1.1E+04 nc
	5.0E-02	i	5.0E-02	r 0	0.10	17804-35-2	Benomyl	3.1E+03 nc 4.4E+04 nc 1.8E+02 nc 1.8E+03 nc
	3.0E-02	i	3 0E-02	r 0	0.10	25057-89-0	Bentazon	1.8E+03 nc 2.6E+04 nc 1.1E+02 nc 1.1E+03 nc
	1.0E-01	i	1.0E-01	r 0	0.10	100-52-7	Benzaldehyde	6.1E+03 nc 8.8E+04 nc 3.7E+02 nc 3.6E+03 nc
2.9E-02		n 2.7E-02 i	1 7E-03	n 1		71-43-2	Benzene	6.7E-01 car 1.5E+00 car 2.5E-01 car 4.1E-01 car 3.0E-02 2E-03
2 3E+02	3.0E-03	i 2.3E+02 i	3.0E-03	r 0		92-87-5	Benzidine	2.1E-03 ca 1.1E-02 ca 2.9E-05 ca 2.9E-04 ca
	4.0E+00	i	4.0E+00	r 0		65-85-0	Benzoic acid	1.0E+05
1.3E+01		1.3E+01 r		0		98-07-7	Benzotrichloride	
	3.0E-01		3.0E-01	r 0	0.10	100-51-6	Benzyl alcohol Benzyl chloride	1.8E+04 nc 1.0E+05 max 1.1E+03 nc 1.1E+04 nc 8.9E-01 ca 2.3E+00 ca 4.0E-02 ca 6.6E-02 ca
1.7E-01	2.05.02	1.7E-01	675.00	1 i 0		100-44-7 7440-41-7	Beryllium and compounds	0.9E-01
	2.0E-03	i 8.4E+00 i	5.7E-06	1 0		141-66-2	IBidrin	1.3E+02 nc 2.2E+03 ea 0.0E+04 ca 7.3E+04 nc 0.3E+04 3E+0
	1.0E-04 1.5E-02	:	1.0E-04 1.5E-02	r O		82657-04-3	Biphenthrin (Talstar)	9.2E+02 nc 1.3E+04 nc 5.5E+01 nc 5.5E+02 nc
	5.0E-02	i	5.0E-02	r 1		92-52-4	1,1-Biphenyl	3.5E+02 sat 3.5E+02 sat 1.8E+02 nc 3.0E+02 nc
1.1E+00	3.02-02	1 2E+00	3.02-02	1		111-44-4	Bis(2-chloroethyl)ether	2.1E-01 ca 6.2E-01 ca 5.8E-03 ca 9.8E-03 ca 4.0E-04 2E-09
	4.0E-02	i 3.5E-02 I	4.0E-02	r 1		108-60-1	Bis(2-chloroisopropyl)ether	2.9E+00 ca 8.1E+00 ca 1.9E-01 ca 2.7E-01 ca
2.2E+02	i	2.2E+02		1		542-88-1	Bis(chloromethyl)ether	1.9E-04 ca 4.4E-04 ca 3.1E-05 ca 5.2E-05 ca
7.0E-02		3.5E-02	1	0	0 10	108-60-1	Bis(2-chloro-1-methylethyl)ether	6.9E+00 ca 3.5E+01 ca 1.9E-01 ca 9.6E-01 ca
1.4E-02	i 2.0E-02	i 1.4E-02 i	2.2E-02	r O	0 10	117-81-7	Bis(2-ethylhexyl)phthalate (DEHP)	3.5E+01 ca* 1.8E+02 ca 4.8E-01 ca 4.8E+00 ca
	5.0E-02	i	5.0E-02	r 0	0 10	80-05-7	Bisphenol A	3.1E+03 nc 4.4E+04 nc 1.8E+02 nc 1.8E+03 nc
	9.0E-02	i	5.7E-03	h 0	0 10	7440-42-8	Boron	5.5E+03 nc 7.9E+04 nc 2.1E+01 nc 3.3E+03 nc
			2.0E-04	h 0	0.10	7637-07-2	Boron trifluoride	7.3E-01 nc
	2.0E-02	n	2.9E-03	n 1		108-86-1	Bromobenzene	2.8E+01 nc 9.2E+01 nc 1.0E+01 nc 2.0E+01 nc
6.2E-02	i 2.0E-02	6.2E-02	2.0E-02	r 1		75-27-4	Bromodichloromethane	1.0E+00 ca 2.4E+00 ca 1.1E-01 ca 1.8E-01 ca 6E-01 3E-07
7.9E-03	i 2.0E-02	i 3.9E-03	2.0E-02	r 0		75-25-2	Bromoform (tribromomethane)	6.2E+01 car 3.1E+02 car 1.7E+00 car 8.5E+00 car 8E-01 4E-02
	1.4E-03	i	1.4E-03	i 1		74-83-9	Bromomethane (Methyl bromide)	3.9E+00 nc 1.3E+01 nc 5.2E+00 nc 8.7E+00 nc 2E-01 1E-02
				0		101-55-3	4-Bromophenyl phenyl ether	0.45.00 4.55.00 4.05.00
	5.0E-03	h	5.0E-03	r 0		2104-96-3	Bromophos Bromoxynil	3.1E+02 nc 4.4E+03 nc 1.8E+01 nc 1.8E+02 nc 1.2E+03 nc 1.8E+04 nc 7.3E+01 nc 7.3E+02 nc
	2.0E-02	i	2.0E-02	г 0		1689-84-5	[Bromoxynii octanoate	
1.8E+00	2.02.02	i 1.8E+00	2.0E-02	r 0 1	0.10	1689-99-2 106-99-0	11,3-Butadiene	1.2E+03 nc 1.8E+04 nc 7.3E+01 nc 7.3E+02 nc 3.5E-03 ca 7.6E-03 ca 3.7E-03 ca 6.2E-03 ca
1.8E+00	r 1.0E-01	1.85+00	1.0E-01	r 0	0.10	71-36-3	1-Butanol	6.1E+03 nc 8.8E+04 nc 3.7E+02 nc 3.6E+03 nc 2E+01 9E-0
	5.0E-02	i	5.0E-02	r O		2008-41-5	Butylate	3.1E+03 nc 4.4E+04 nc 1.8E+02 nc 1.8E+03 nc
		n n	1.0E-02	r 1	0.10	104-51-8	In-Butylbenzene	1.4E+02 nc 2.4E+02 sat 3.7E+01 nc 6.1E+01 nc
		n	1.0E-02	r 1		135-9-88	sec-Butylbenzene	1.1E+02 nc 2.2E+02 sat 3.7E+01 nc 6.1E+01 nc
		n	1.0E-02	r 1		98-06-6	Itert-Butylbenzene	1.3E+02 nc 3.9E+02 sat 3.7E+01 nc 6.1E+01 nc
	2.0E-01	· }	2.0E-01	r 0	0.10	85-68-7	Butyl benzyl phthalate	1.2E+04 nc 1.0E+05 max 7.3E+02 nc 7.3E+03 nc 9E+02 8E+0
	1.0E+00	i	1.0E+00	r 0		85-70-1	Butylphthalyl butylglycolate	6.1E+04 nc 1.0E+05 max 3.7E+03 nc 3.6E+04 nc
	3.0E-03	h	3.0E-03	r O	0.10	75-60-5	Cacodylic acid	1.8E+02 nc 2.6E+03 nc 1.1E+01 nc 1.1E+02 nc
	5.0E-04	i 6.3E+00	i	0	0.001	7440-43-9	Cadmium and compounds "CAL-Modified PRG" (PEA, 1994)	3.7E+01 nc 8.1E+02 nc 1.1E-03 ca 1.8E+01 nc 8E+00 4E-0
	5.0E-01	i	5.0E-01	r O		105-60-2	Caprolactam	3.1E+04 nc 1.0E+05 max 1.8E+03 nc 1.8E+04 nc
	h 2.0E-03	8.6E-03	2.02.00	r O		2425-06-1	Captafol	5.7E+01 ca* 2.9E+02 ca* 7.8E-01 ca* 7.8E+00 ca* 1.4E+00 ca*
3.5E-03	h 1.3E-01	i 3.5E-03	1.02.01	r 0		133-06-2	Captan	1.4E+U2
	1.0E-01 ·	i	1.1E-01	r 0		63-25-2	Carbaryl	.6.1E+03 nc 8.8E+04 nc 4.0E+02 nc 3.6E+03 nc
2.0E-02		2.0E-02		0		86-74-8	Carbazole	2.4E+01 ca 1.2E+02 ca 3.4E-01 ca 3.4E+00 ca 6E-01 3E-02
	5.0E-03	i	5.0E-03	۲ 0	0.10	1563-66-2	Carbofuran Page 2 of 13 at the	3.1E+02 nc 4.4E+03 nc 1.8E+01 nc 1.8E+02 nc

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	:	4 14 1 4V		i de Car		
					1 4 4 1 1 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1	
Key: i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUT	ACCONOMINATE CONTRACTOR OF THE	Anna Carata Anna Anna Anna	A CAS ACAD EST SON PROPERTY.	3 LIMIT *(where:	nc < 100X ca) **(where	: nc < 10X ca)
L FARD	LANNING PURPO	NGEG				
	LAMMO I CINE	UULU			143	"我我 们是一种"。
		44				Eller Marketine
TOXICITY INFORMATION V skin	<u>CONTAMINANT</u>		IINARY REMEDIA			SCREENING LEVELS Migration to Ground Water
SF0 RfDo SFI RfDi O abs CAS No.		Residential	Industrial	Ambient Air	Tap Water	DAF 20 DAF 1
1/(mg/kg-d) (mg/kg-d) 1/(mg/kg-d) (mg/kg-d) C soils		- Sail (mg/kg)	Sail (mg/kg)	/ы: (ug/m^3) -*	+y v (Ūg/I) τ	(mg/kg) + (mg/kg) +
1.0E-01 i 2.0E-01 i 1 75-15-0	Carbon disulfide	3.6E+02 no		7.3E+02 no		3E+01 2E+00
1.3E-01 i 7.0E-04 i 5.3E-02 i 7.0E-04 r 1 56-23-5	Carbon tetrachloride	2.4E-01 ca	0.05.00	1.3E-01 ca		7E-02 3E-03
1.0E-02 i 1.0E-02 r 0 0.10 55285-14-8	Carbosulfan Carboxin	6.1E+02 no 6.1E+03 no		3.7E+01 no		
1.0E-01 i 1.0E-01 r 0 0.10 5234-68-4 2.0E-03 i 2.0E-03 r 0 0.10 302-17-0	Chloral	6.1E+03 no 1.2E+02 no	: 8.8E+04 nc : 1.8E+03 nc	3.7E+02 no 7.3E+00 no		
1.5E-02 i 1.5E-02 r 0 0.10 133-90-4	Chloramben	9.2E+02 no		5.5E+01 no		
4.0E-01 h 4.0E-01 r 0 0.10 118-75-2	IChloranil	1.2E+00 ca		1.7E-02 ca		
3.5E-01 i 5.0E-04 i 3.5E-01 i 2.0E-04 i 0 0.04 12789-03-6	Chlordane	1.6E+00 ca		1.9E-02 ca		1E+01 5E-01
2.0E-02 i 2.0E-02 r 0 0.10 90982-32-4	Chlorimuron-ethyl	1.2E+03 no	1.8E+04 nc	7.3E+01 no	7.3E+02 nc	
1.0E-01 i 7782-50-5	Chlorine				3.6E+03 nc	
5.7E-05 i 10049-04-4	Chlorine dioxide	!		2.1E-01 no	8	
1 107-20-0	Chloroacetaldehyde		1 05 .05	- AF AA		
2.0E-03 h 2.0E-03 r 0 0.10 79-11-8	Chloroacetic acid	1.2E+02 no 3.3E-02 no	: 1.8E+03 nc : 1.1E-01 nc	7.3E+00 no 3.1E-02 no		
8.6E-06 r 8.6E-06 i 1 532-27-4 4.0E-03 i 4.0E-03 r 0 0.10 106-47-8	2-Chloroacetophenone 4-Chloroaniline	3.3E-02 no 2.4E+02 no			s 5.2E-02 nc s 1.5E+02 nc	7E-01 3E-02
2.0E-02 i 1.7E-02 n 1 108-90-7	Chlorobenzene	1.5E+02 no		6.2E+01 no		1E+00 7E-02
2.7E-01 h 2.0E-02 i 2.7E-01 h 2.0E-02 r 0 0.10 510-15-6	Chlorobenzilate	1.8E+00 ca		2.5E-02 ca		12.00 12-02
2.0E-01 h 2.0E-01 r 0 0.10 74-11-3	p-Chlorobenzoic acid	1.2E+04 no	4.055.05		c 7.3E+03 nc	
2.0E-02 h 2.0E-02 r 0 0.10 98-56-6	4-Chlorobenzotrifluoride	1.2E+03 no	: 1.8E+04 nc	7.3E+01 no		
2.0E-02 h 2.0E-03 h 1 126-99-8	2-Chloro-1,3-butadiene	3.6E+00 no	1.2E+01 nc	7.3E+00 no		
4.0E-01 h 4.0E-01 r 1 109-69-3	1-Chlorobutane	4.8E+02 sa		1.5E+03 no		
1.4E+01 r 1.4E+01 i 1 75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	3.4E+02 sa		5.2E+04 no		
1.4E+01 r 1.4E+01 i 1 75-45-6	Chlorodifluoromethane	3.4E+02 sa		5.1E+04 no		
2.9E-03 n 4.0E-01 n 2.9E-03 r 2.9E+00 i 1 75-00-3	Chloroethane	3.0E+00 ca	a 6.5E+00 ca	2.3E+00 ca	a 4.6E+00 ca	
1 110-75-8 6.1E-03 i 1.0E-02 i 8.1E-02 i 8.6E-05 n 1 . 67-66-3	2-Chloroethyl vinyl ether Chloroform	2.4E-01 ca	·· 5.2E-01 ca**	8.4E-02 ca	·· 1.6E-01 ca···	6E-01 3E-02
6.1E-03 i 1.0E-02 i 8.1E-02 i 8.6E-05 n 1 . 67-66-3 1.3E-02 h . 6.3E-03 h 8.6E-02 n 1 . 74-87-3	Chloromethane	1.2E+00 ca		1.1E+00 ca		02-01 32-02
5.8E-01 h 5.8E-01 r 0 0.10 95-69-2	4-Chloro-2-methylaniline	1 8.4E-01 ca	4.3E+00 ca	1.2E-02 ca		
4.6E-01 h 4.6E-01 r 0 0.10 3165-93-3	4-Chloro-2-methylaniline hydrochloride	1.1E+00 ca		1.5E-02 ca		·
8.0E-02 i 8.0E-02 r 1 91-58-7	beta-Chloronaphthalene	4.9E+03 no	c 2.7E+04 nc	2.9E+02 no	c 4.9E+02 nc	
2.5E-02 h 2.5E-02 r r 1 88-73-3	o-Chloronitrobenzene	8.1E+00 ca		2.7E-01 ca		
1.8E-02 h 1.8E-02 r r 1 100-00-5	p-Chloronitrobenzene	1.1E+01 ca	a 3.2E+01 ca	3.7E-01 ca	4.	
5.0E-03 i 5.0E-03 r 1 95-57-8	2-Chlorophenol	6.3E+01 no			c 3.0E+01 nc	4E+00 2E-01
2.9E-02 r 2.9E-02 h 1 75-29-6	2-Chloropropane	1.7E+02 no		1.0E+02 no	- 7	
1.1E-02 h 1.5E-02 i 1.1E-02 r 1.5E-02 r 0 0.10 1897-45-6	Chlorothalonil lo-Chlorotoluene	4.4E+01 ca 1.6E+02 no			1 6.1E+00 ca*	
2.0E-02 i 2.0E-02 r 1 95-49-8	Chlorpropham	 		7.3E+01 no 7.3E+02 no		
2.0E-01 i 2.0E-01 r 0 0.10 101-21-3 3.0E-03 i 3.0E-03 r 0 0.10 2921-88-2	Chlorpyrifos	1.2E+04 no		7,3E+02 no 1.1E+01 no		1.1. Av. 1983.
1.0E-02 h 1.0E-02 r 0 0.10 5598-13-0	Chlorpyrifos-methyl				c 3.6E±02 nc	
5.0E-02 i 5.0E-02 r 0 0.10 64902-72-3	Chlorsulfuron				c 1.8E+03 nc	<u> </u>
8.0E-04 h 8.0E-04 r 0 0.10 60238-56-4	Chlorthiophos	4.9E+01 no	c 7.0E+02 nc		c 2.9E+01 nc	. •
4.2E+01 i 0	Total Chromium (1:6 ratio Cr VI:Cr III)	2.1E+02 ca	a 4.5E+02 ca	1.6E-04 ca	a	4E+01 2E+00
1.5E+00 (16065-83-1	Chromium III		x 1.0E+05 max		5.5E+04 nc	The second second
3.0E-03 i 2.9E+02 i 0 18540-29-9	Chromium VI		·· 6.4E+01 ca	2.3E-05 ca	1.1E+02 nc	4E+01 2E+00
	"CAL-Modified PRG" (PEA, 1994)	2.0E-01	4 N		2E-01	THE STATE OF THE S
6.0E-02 n 7440-48-4	Cobalt Coke Oven Emissions	4.7E+03 no	c 1.0E+05 max	2 15 02	2.2E+03 nc	
2.2E+00 i 0 8007-45-2	10	2.9E+03 no	c 7.6E+04 nc	3.1E-03 ca	4 45 00	
3 7E-02 h 0 7440-50-8	Copper and compounds Page 3 of 13	1 2.3L+U3 no	c /.QL∓U4 nc		1.4E+03 nc	a^{\prime} , a^{\prime}

					FC	R P	LANNING PURP	OSE	S							1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
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	TOXICITY	INFORMA	TION				<u>CONTÁMINANT</u>	PRE	LIMIN	ARY RE	MEDI/	ATION GC	ALS	(PRGs)	SOIL	SCREENIN	
SFo	RfDo	S Fi	200		skin :	CAS No.		Residentia		Industria	1.57			Tap Water		Migration to	o Ground Wa
ລ⊧o (mg/kg-d)	(mg/kg-d)	42 12 12 15 15 W. T.	RfDi (mg/kg-d)	C 70 - 4 - 4 -	soils	CASING.		Soil (male	ai m	Soil (ma	kn)	(un/m^3)			a Yay	DAF 20 (mg/kg)	(marko)
1.9E+00 F			r	1	, Jones	123-73-9	Crotonaldehyde	T 5.3E-03		1.1E-02	ca	3.5E-03	ca	5.9E-03	ca		. (0.9-9)
	1.0E-01	1	1.1E-01	i 1		98-82-8	Cumene (isopropylbenzene)	1.6E+02		5.2E+02	nc	4.0E+02		6.6E+02	nc		
8.4E-01 h		h 8.4E-01	r 2.0E-03	r 0		21725-46-2	Cyanazine	5.8E-01		2.9E+00	ca	8.0E-03	ca	8.0E-02	ca		
						n/a	Cyanides										
	1.0E-01	h		O	0.10	542-62-1	Barium cyanide	6.1E+03	nc	1.0E+05	max			3.6E+03	nc		
	4.0E-02	i		0		592-01-8	Calcium cyanide	2.4E+03		3.5E+04	nc			1.5E+03	nc		
	5.0E-03	i		0	0.10	544-92-3	Copper cyanide	3.1E+02	nc	4.4E+03	nc	3-1-1-1 management		1.8E+02	nc		
	2.0E-02	i		0		57-12-5	Free cyanide	1.2E+03		1.8E+04	nc			7.3E+02	nc	4E+01	2E+00
	2.0E-02	i	8.6E-04	i 1		74-90-8	Hydrogen cyanide	1.1E+01	nc	3.5E+01	nc	3.1E+00	nc	6.2E+00	nc		
	5.0E-02	i		0	0.10	151-50-8	Potassium cyanide	3.1E+03		4.4E+04	nc			1.8E+03	nc		
	2.0E-01	i		0		506-61-6	Potassium silver cyanide	1.2E+04		1.0E+05	max			7.3E+03	nc		
	1.0E-01	i		0		506-64-9	Silver cyanide	6.1E+03	nc	8.8E+04	nc			3.6E+03	nc		
	4.0E-02	i		0		143-33-9	Sodium cyanide	2.4E+03	nc	3.5E+04	nc			1.5E+03	nc		
	5.0E-02	i		0		557-21-1	Zinc cyanide	3.1E+03		4.4E+04	nc			1.8E+03	пс		
	4.0E-02	i	4.0E-02	r 1		460-19-5	Cyanogen	1.3E+02	nc	4.3E+02	пс	1.5E+02	nc	2.4E+02	nc		
	9.0E-02	i	9.0E-02	r 1		506-68-3	Cyanogen bromide	12.9E+02	nc	9.7E+02	nc	3.3E+02	nc	5.5E+02	nc		
	5.0E-02	i	5.0E-02	r 1		506-77-4	Cyanogen chloride	1.6E+02	nc	5.4E+02	nc	1.8E+02	nc	3.0E+02	nc		
	5.0E+00	i	5.0E+00	г 0	0.10	108-94-1	Cyclohexanone	1.0E+05	max	1.0E+05	max	1.8E+04	nc	1.8E+05	nc		
	2.0E-01	ì	2.0E-01	1 0	0.10	108-91-8	TCyclohexylamine	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
	5.0E-03	i	5.0E-03	r 0		68085-85-8	Cyhalothrin/Karate	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
	1.0E-02	i	1.0E-02	r O	0.10	52315-07-8	Cypermethrin	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
	7.5E-03	i	7.5E-03	r O	0.10	66215-27-8	Cyromazine	4.6E+02	ne	6.6E+03	nc	2.7E+01	nc	2.7E+02	nc		
	1.0E-02	i	1.0E-02	r O	0.10	1861-32-1	Dacthal	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
	3.0E-02	i	3.0E-02	r 0		75-99-0	Dalapon	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
	2.5E-02	i	2.5E-02	r 0	0.10	39515-41-8	Danitol	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
2.4E-01 i		2.4E-01	r	0	0.03	72-54-8	DDD .	2.4E+00	ca	1.7E+01	ca	2.8E-02	ca	2.8E-01	ca	2E+01	8E-01
3.4E-01 i		3.4E-01	r	0	0.03	72-55-9	DDE	1.7E+00	ca	1.2E+01	ca	2.0E-02	ca	2.0E-01	ca	5E+01	3E+00
3.4E-01 i	5.0E-04	i 3,4E-01	i 5.0E-04	r 0	0.03	50-29-3	IDDT	1.7E+00	ca*	1.2E+01	ca*	2.0E-02	ca*	2.0E-01	ca*	3E+01	2E+00
	1.0E-02	i	1.0E-02	r 0	0.10	1163-19-5	Decabromodiphenyl ether	6.1E+02	nç	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
	4.0E-05	i	4.0E-05	r 0	0.10	8065-48-3	Demeton	2.4E+00	nc	3.5E+01	nc	1.5E-01	nc	1.5E+00	nc		
3.1E-02 F		6.1E-02	r	0	0,10	2303-16-4	Diallate	8.0E+00	ca	4.0E+01	ca	1.1E-01	ca	1.1E+00	ca		
	9.0E-04	h	9.0E-04	r O	0.10	333-41-5	Diazinon	5.5E+01	nc	7.9E+02	nc	3.3E+00	nc	3.3E+01	nc		
	4.0E-03	x	4.0E-03	r 1		132-64-9	Dibenzofuran	2.9E+02	nc	5.1E+03	nc	1.5E+01	nc	2.4E+01	nc		
·	1.0E-02	i	1.0E-02	r O	0.10	106-37-6	11,4-Dibromobenzene	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
3.4E-02 i	2.0E-02	i 8.4E-02	r 2.0E-02	r 1		124-48-1	Dibromochloromethane	1.1E+00		2.7E+00	ca	8.0E-02	ca	1.3E-01	ca	4E-01	2E-02
.4E+00 h		r 2.4E-03	h 5.7E-05	i 1		96-12-8	1,2-Dibromo-3-chloropropane	4.5E-01		4.0E+00	ca**	2.1E-01	nc	4.8E-02	ca**		
							"CAL-Modified PRG" (PEA, 1994)	6.0E-02				9.6E-04		4.7E-03			
1.5E+01 i	5.7E-05	r 7.7E-01	i 5.7E-05	h 1		106-93-4	1,2-Dibromoethane	6.9E-03	ca	4.8E-02	ca*	8.7E-03	ca*	7.6E-04	ca		
	1.0E-01	1	1.0E-01	r 0	0.10	84-74-2	Dibutyl phthalate	6.1E+03		8.8E+04	nc	3.7E+02	nc	3.6E+03	nc	2E+03	3E+02
	3.0E-02	i	3.0E-02	r 0		1918-00-9	Dicamba	1.8E+03		2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
	9.0E-02	i	5.7E-02	h 1		95-50-1	1,2-Dichlorobenzene	3.7E+02		3.7E+02		2.1E+02		3.7E+02	nc	2E+01	9E-01
		n	9.00E-04	r 1		541-73-1	1,3-Dichlorobenzene	1.3E+01		5.2E+01	nc	3.3E+00	nc	5.5E+00	nc	•.	
2.4E-02 h		· · · · · · · · · · · · · · · · · · ·	n 3.00E-02	i 1		106-46-7	11.4-Dichlorobenzene	3.4E+00		8.1E+00	ca	3.1E-01	ca	5.0E-01	ca	2E+00	1E-01
4.5E-01 i		4.5E-01	r		0.10	91-94-1	3,3-Dichlorobenzidine	1.1E+00		5.5E+00		1.5E-02	ca	1.5E-01	ca	7E-03	3E-04
.3E+00 r			h	1	****	764-41-0	1.4-Dichloro-2-butene	7.9E-03		1.8E-02	ca	7.2E-04	ca	1.2E-03	ca		J_ V.
	2.0E-01	i	5.7E-02	h 1		75-71-8	Dichlorodifluoromethane	9.4E+01		3.1E+02	nc	2.1E+02	nc	3.9E+02	nc		
	1.0E-01	h	1.4E-01	h 1		75-34-3	1.1-Dichloroethane	5.9E+02		2.1E+03	лс	5.2E+02	nc	8.1E+02	nc	2E+01	1E+00
).1E-02 i			i 1.4E-03	n 1		107-06-2	1,2-Dichloroethane (EDC) Page 4 of 13	3.5E-01		7.6E-01	ca*	7.4E-02	ca*	1.2E-01	ca*	2E-02	1E-03

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Key: i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 100X ca) FOR PLANNING PURPOSES PRELIMINARY REMEDIATION GOALS (PRGS) SOIL SCREENING LEVELS TOXICITY INFORMATION CONTAMINANT Residential Industrial Ambient Air Tap Water DAF 20 DAF 1
Soil (mg/kg) Soil (mg/kg) (ug/m²3) Hug/n) (mg/kg) (mg/kg) (mg/kg) SFo RfDo O abs. CAS No. SF RHD: /(mg/kg-d) ... (mg/kg-d) 1/(mg/kg-d) (mg/kg-d) C soils 3.5E-03 1.0E-01 r 0 0.10 1.4E+02 ca 7.0E+02 ca 1.9E+00 ca 1.9E+01 3.5E-03 1 0E-01 133-07-3 olpet Fomesafen 2.6E+00 ca 1.3E+01 3.5E-02 ca 3.5E-01 1.9F-01 1.9E-01 0 0.10 72178-02-0 Fonofos 1.2E+02 1.8E+03 7.3E+00 nc 7.3E+01 2.0E-03 2.0E-03 г 0 0.10 944-22-9 nc 9.2E+03 ca 5.5E+03 1 5E-01 50-00-0 Formaldehyde 4.6E-02 0 0 10 nc 7.3E+04 Formic Acid 1.0E+05 1.0E+05 7.3E+03 2.0E+00 2.0E+00 r 0 0.10 64-18-6 nc 3.0E+00 3.0E+00 r n 0.10 39148-24-8 Fosetyl-al 1.0E+05 max 1.0E+05 1.1E+04 nc 1.1E+05 1.0E-03 Furan 2.5E+00 nc 8.5E+00 nc 6.1E+00 1.0E-03 110-00-9 Furazolidone 1.3E-01 6.5E-01 1.8E-03 ca 1.8E-02 ca 3.8E+00 h 3.8E+00 0 0.10 67-45-8 ca ca 1.8E+02 2.6E+03 5.2E+01 nc 1.1E+02 Furfural nc 3 0F-03 1.4E-02 h 0 0.10 98-01-1 9.7E-03 4.9E-02 1.3E-04 5.0E+01 5.0E+01 0.10 531-82-8 urium 1.6E+01 8.2E+01 2.2E-01 2.2E+00 3.0E-02 3.0E-02 0.10 60568-05-0 Furmecyclox ca ca 0 Glufosinate-ammonium 2.4E+01 3.5E+02 1.5E+00 4.0E-04 4.0E-04 r 0 0.10 77182-82-2 1.5E+01 765-34-4 Glycidaldehyde 2.4E+01 3.5E+02 1.0E+00 4.0E-04 2.9E-04 h 0 0.10 Glyphosate 6.1F+03 1071-83-6 nc 8.8E+04 3.7E+02 nc 3.6E+03 1.0F-01 1.0E-01 r 0 0.10 nc nc 4.4E+01 nc 1.8E+00 69806-40-2 Haloxyfop-methyl 3.1E+00 1.8E-01 5.0F-05 5.0E-05 r 0 0 10 7.9E+02 1.3E-02 1.3E-02 79277-27-3 Harmony 1.1E-01 ca 5.5E-01 1.5E-03 ca 1.5E-02 2E+01 1E+00 Heptachlor 4.5E+00 i 5.0E-04 5.0E-04 r 0 0,10 76-44-8 ca 5.3E-02 2.7E-01 7E-01 3E-02 Heptachlor epoxide 7.4E-03 9.1E+00 1.3E-05 1.3E-05 г 0 0.10 1024-57-3 ca* 2.0E-03 2.0E-03 87-82-1 Hexabromobenzene 1.2E+02 1.8E + 037.3E + 010.10 r O 3.0E-01 ca 1.5E+00 4.2E-03 4.2E-02 2E+00 1E-01 8.0E-04 Hexachlorobenzene ca ca 1.6E+00 1.6E+00 8.0E-04 r 0 0.10 118-74-1 ca 6.2E+00 3.2E+01 8.6E-02 8.6E-01 2E+00 1E-01 Hexachlorobutadiene ca** 7.8E-02 2.0E-04 h 7.8E-02 2.0E-04 r O 0.10 87-68-3 ca** ca** ca** 6.3E+00 6.3E+00 HCH (alpha) 9.0E-02 ca 5E-04 3E-05 0 0.04 319-84-6 ca 2.1E+00 3.7E-03 3E-03 HCH (beta) 3.2E-01 ca 3.7E-02 1E-04 1.8E+00 1 8F+00 ٥ 0.04 319-85-7 са HCH (gamma) Lindane 4.4E-01 ca* 2.9E+00 5.2E-03 5.2E-02 9E-03 5E-04 1.3E+00 h 3.0E-04 1.3E+00 58-89-9 3 0E-04 r 0 0.04 HCH-technical 3.2E-01 1E-04 1.8E+00 1.8E+00 0.04 608-73-1 ca 3.7E-02 3E-03 0 4.2E+02 5.9E+03 7.3E-02 nc 2.6E+02 4E+02 2E+01 Hexachlorocyclopentadiene 7.0E-03 2.0E-05 h 0 0.10 77-47-4 7.8E-05 4.0E-04 1.5E-06 ca 1.1E-05 6.2E+03 0 0.10 19408-74-3 Hexachlorodibenzo-p-dioxin mixture (HxCDD) ca ca 4 6F+03 1.4E-02 1 1.0E-03 0.10 67-72-1 Hexachloroethane 3.5E+01 5E-01 2E-02 1.4E-02 1.0E-03 r 0 Hexachlorophene 1.8E+01 nc 2.6E+02 1.1E+00 nc 1.1E+01 3.0E-04 r 0 0.10 70-30-4 nc 3.0E-04 Hexahydro-1,3,5-trinitro-1,3,5-triazine 4.4E+00 2.2E+01 6.1E-02 6.1E-01 121-82-4 1.1E-01 3.0E-03 1.1E-01 3.0E-03 r 0 0 10 1,6-Hexamethylene diisocyanate 2.9E-06 2.9E-06 822-06-0 1.7E-01 nc 2.5E+00 1.1E+02 3.5E+02 110-54-3 n-Hexane 1.1E+02 sat 2.1E+02 6.0E-02 5.7E-02 i t nc 2.9E+04 2.0E+03 1.2E+02 1.2E+03 3.3E-02 3.3E-02 r 0 0.10 51235-04-2 Hexazinone 302-01-2 Hydrazine, hydrazine sulfate 8.2E-01 3.9E-04 ca 3.0E+00 i Hydrogen chloride 2.1E+01 5.7E-03 7647-01-0 nc Hydrogen sulfide 1.0E+00 nc 1.1E+02 3 0E-03 2.9E-04 7783-06-4 1.5E+02 4.0E-02 4.0E-02 r 0 0.10 123-31-9 p-Hydroquinone 7.9E+02 nc 1.1E+04 nc 4.7E+01 35554-44-0 lmazalil nc 4.7E+02 1.3F-02 r 0 0 10 nc 1.3E-02 nc : 9.1E+03 81335-37-7 mazaguin 1.5E+04 nc 1.0E+05 max 9.1E+02 2.5E-01 2.5E-01 r 0 0 10 nc 1.5E+03 prodione 2.4E+03 nc 3.5E+04 ńc 4.0E-02 4.0E-02 r O 0.10 36734-19-7 2.3E+04 nc 1.0E+05 1.1E+04 3.0E-01 0 7439-89-6 Iron 1.3E+04 4.0E+04 nc 1.8E+03 sat 1.1E+03 3.0E-01 3.0E-01 78-83-1 Isobutanolnc 78-59-1 Isophorone 5.1E+02 2.6E+03 ca 7.1E+01 -5E-01 3E-02 9.5F-04 2.0E-01 r 0 0.10 9 5E-04 2.0E-01 9.2E+02 1.3E+04 nc 5.5E+01 nc 5.5E+02 33820-53-0 Isopropalin nc 1.5E-02 r 0 010 1.5E-02 6.1E+03 nc 8.8E+04 nc 4.0E+02 nc 3.6E+03 1832-54-8 Isopropyl methyl phosphonic acid r 0 0 10 oc. 1.0E-01 1.1E-01 3.1E+03 nc 4.4E+04 1.8E+02 1.8E+03 5.0E-02 r 0 0.10 82558-50-7 Isoxaben 5.0E-02 2.7E-02 1.4E-01 3.7E-04 3.7E-03 Kepone 18E+01 n 1.8E+01 0 0.10 143-50-0 1.2E+02 7.3E+00 7.3E+01 Lactofen nc 1.8E+03 nc r 0 0.10 77501-63-4 nc 2 0F-03 2.0E-03 Page 7 of 13

Key: i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) **(where: nc < 100X ca)

	Carried March)DD	LANNING PURP	UCEC
, Fig. (1)					ΓĽ	JN F	LANNING FURF	UOEO
	TOVICITY	INFORMAT	ION				CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PROS) SOIL SCREENING LEVEL
	IONICITY	INFURNAI	IUN	V	skin		CONTAMINANT	Migration to Ground We
" "	⊱ RfDo	ŠFi	RfDi		abs soils	CAS No.	$\mathcal{L}_{\mathcal{A}}$, which is the $\mathcal{L}_{\mathcal{A}}$	Migration to Ground W. Residential Industrial Ambiert Air Tap Water DAF 20 DAF 3 Soil (mg/kg) Soil (mg/kg) (ug/if (mg/kg) (mg/kg)
ng/kg-d)	(mg/kg-d)	1/(mg/kg-d)	(mg/kg-d)	U C	SOIIS	7400 00 4	ILead	Soli (mg/kg) Soli (mg/kg) (ug/m 2 3)
s Based o		UBK (1994) and T	HW (1996)	0	0.40	7439-92-1	Lead (tetraethyl)	1
	1 0E-07 2.0E-03		2.0E-03	r O	0.10	78-00-2 330-55-2	Linuron	6.1E-03 nc 8.8E-02 nc 3.6E-03 nc 1.2E+02 nc 1.8E+03 nc 7.3E+00 nc 7.3E+01 nc
			2.05-03	0	0.70	7439-93-2	Lithium	1.6E+03 nc 4.1E+04 nc 7.3E+02 nc
	2.0E-02		2.0E-01		0.10	83055-99-6	Londax	1.2E+04 nc 1.0E+05 max 7.3E+02 nc 7.3E+03 nc
	2.0E-01 2.0E-02		2.0E-01 2.0E-02	r 0 r 0	0.10	121-75-5	Malathion	1.2E+03 nc 1.8E+04 nc 7.3E+01 nc 7.3E+02 nc
	1.0E-01		1.0E-01	r 0	0.10	108-31-6	[Maleic anhydride	6.1E+03 nc 8.8E+04 nc 3.7E+02 nc 3.6E+03 nc 1
	5 0E-01		5.0E-01	r 1	0.10	123-33-1	Maleic hydrazide	1.7E+03 nc 2.4E+03 sat 1.8E+03 nc 3.0E+03 nc
	2.0E-05		2.0E-01	r O	0.10	109-77-3	Malononitrile	1.2E+00 nc 1.8E+01 nc 7.3E-02 nc 7.3E-01 nc
	3.0E-02		3.0E-02	r 0	0.10	8018-01-7	IMancozeb	1.8E+03 nc 2.6E+04 nc 1.1E+02 nc 1.1E+03 nc
.0E-02		i 6.0E-02 r	5.0E-02	r O	0.10	12427-38-2	Maneb	8.1E+00 ca ⁻ 4.1E+01 ca 1.1E-01 ca 1.1E+00 ca
.00-02	2.4E-02	i o,oc-oz r	1,4E-05	i O	0.10	7439-96-5	Manganese and compounds	1.8E+03 nc 3.2E+04 nc 5.1E-02 nc 8.8E+02 nc
	9.0E-05		9.0E-05	r 0	0.10	950-10-7	IMephosfolan	5.5E+00 nc 7.9E+01 nc 3.3E-01 nc 3.3E+00 nc
	3.0E-02		3.0E-02	r 0	0.10	24307-26-4	Mepiguat	1.8E+03 nc 2.6E+04 nc 1.1E+02 nc 1.1E+03 nc
9E-02		n 29E-02 r	1.0E-01	r O	0.10	149-30-4	2-Mercaptobenzothiazole	1.7E+01 ca 8.5E+01 ca 2.3E-01 ca 2.3E+00 ca
96-02	3 0E-04	2 96-02 1	1.05-01	0	0.10	7487-94-7	Mercury and compounds	2.3E+01 nc 6.1E+02 nc 1.1E+01 nc
	3 UE-U4		. 0 0 5 0 6			7439-97-6	Mercury (elemental)	3.1E-01 nc
	1.0E-04		8.6E-05	1 0	0.10	22967-92-6	Mercury (methyl)	6.1E+00 nc 8.8E+01 nc 3.6E+00 nc
			2.05.06	r 0	0.10	150-50-5	[Mereday (methyl)	1.8E+00 nc 2.6E+01 nc 1.1E-01 nc 1.1E+00 nc
	3.0E-05		3.0E-05 3.0E-05			78-48-8	Merphos oxide	1.8E+00 nc 2.6E+01 nc 1.1E-01 nc 1.1E+00 nc
	3.0E-05			r 0	0.10 0.10	57837-19-1	Metalaxyl	3.7E+03 nc 5.3E+04 nc 2.2E+02 nc 2.2E+03 nc
	6.0E-02		6.0E-02 2.0E-04	r 0	0.10	126-98-7	IMethacrylonitrile	2.1E+00 nc 8.8E+00 nc 7.3E-01 nc 1.0E+00 nc
	1.0E-04					126-98-7	Methamidophos	3.1E+00 nc 4.4E+01 nc 1.8E+01 nc 1.8E+00 nc
	5.0E-05		5.0E-05	r 0	0.10	10265-92-6 67-56-1	Methanol	3.1E+04 nc 1.0E+05 max 1.8E+03 nc 1.8E+04 nc
	5.0E-01		5.0E-01	r 0	0.10		Methidathion	
	1.0E-03		1.0E-03	r O	0,10	950-37-8	Methomy	6.1E+01 nc 8.8E+02 nc 3.7E+00 nc 3.6E+01 nc 4.4E+01 nc 1.5E+02 nc 9.1E+01 nc 1.5E+02 nc
	2.5E-02		2.5E-02	r 1		16752-77-5	Methoxychlor	3.1E+02 nc 4.4E+03 nc 1.8E+01 nc 1.8E+02 nc 2E+02 8E+06
	5.0E-03		5.0E-03	t 0	0.10	72-43-5		
	1.0E-03		5.7E-03	i 0	0.10	109-86-4	2-Methoxyethanol	
	2.0E-03 h		2.0E-03	r 0	0.10 0.10	110-49-6 99-59-2	2-Methoxyethanol acetate 2-Methoxy-5-nitroaniline	1.2E+02 nc 1.8E+03 nc 7.3E+00 nc 7.3E+01 nc 1.1E+01 ca 5.4E+01 ca 1.5E-01 ca 1.5E+00 ca
.6E-02		4.6E-02 r		0	0.10		Methyl acetate	
	1.0E+00		1.0E+00	r 1		79-20-9	Methyl acrylate	2.2E+04 nc 9.6E+04 nc 3.7E+03 nc 6.1E+03 nc 7.0E+01 nc 2.3E+02 nc 1.1E+02 nc 1.8E+02 nc
.=	3.0E-02		3.0E-02	r 1	0.40	96-33-3 95-53-4	2-Methylaniline (o-toluidine)	2.0E+00 ca 1.0E+01 ca 2.8E-02 ca 2.8E-01 ca
	h	2.4E-01 r		0	0,10		1	
.8E-01	h .	1.8E-01 r	405 55	0	0.10	636-21-5	2-Methylaniline hydrochloride	
	1.0E+00	<	1.0E+00	r 0	0.10	79-22-1	Methyl chlorocarbonate	
	5.0E-04		5.0E-04	r 0	0.10	94-74-6	2-Methyl-4-chlorophenoxyacetic acid	
	1.0Ë-02		1.0E-02	r O	0.10	94-81-5	4-(2-Methyl-4-chlorophenoxy) butyric acid	1
	1.0E-03	i	1.0E-03	1 0	0.10	93-65-2	2-(2-Methyl-4-chlorophenoxy) propionic acid	6.1E+01 nc 8.8E+02 nc 3.7E+00 nc 3.6E+01 nc 6.1E+01 nc 8.8E+02 nc 3.7E+00 nc 3.6E+01
	1.0E-03		1.0E-03	r 0	0.10	16484-77-8	2-(2-Methyl-1,4-chlorophenoxy) propionic acid	6.1E+01 nc 8.8E+02 nc 3.7E+00 nc 3.6E+01 nc
	8.6E-01		8.6E-01	h 1	4	108-87-2	Methylcyclohexane	2.6E+03 nc 8.8E+03 nc 3.1E+03 nc 5.2E+03 nc
.5E-01	h	2.5E-01 r			0.10	101-77-9	4.4'-Methylenebisbenzeneamine	1.9E+00 ca 9.9E+00 ca 2.7E-02 ca 2.7E-01 ca
	h 7.0E-04 I		7.0E-04	r 0	0.10	101-14-4	4,4'-Methylene bis(2-chloroaniline)	3.7E+00 ca* 1.9E+01 ca* 5.2E-02 ca* 5.2E-01 ca*
.6E-02	i	4.6E-02 r		Ò	0.10	101-61-1	4,4'-Methylene bis(N,N'-dimethyl)aniline	1.1E+01 ca -5.4E+01 ca -1.5E-01 ca -1.5E+00 ca
	1.0E-02		1.0E-02	r 1		74-95-3	Methylene bromide	6.7E+01 nc 2.4E+02 nc 3.7E+01 nc 6.1E+01 nc
5E-03	6.0E-02	1.6E-03 i	8.6E-01	h t		75-09-2	Methylene chloride	8.9E+00 ca 2.1E+01 ca 4.1E+00 ca 4.3E+00 ca 2E-02 1E-03
	1.7E-04	· ·	1.7E-04	i 0	0.10	101-68-8	4,4'-Methylene diphenyl diisocyanate	1.0E+01 nc 1.5E+02 nc 6.2E-01 nc 6.2E+00 nc
	6.0E-01		2.9E-01	i 1		78-93-3	Methyl ethyl ketone	7.3E+03 nc 2.8E+04 nc 1.0E+03 nc 1.9E+03 nc
1E+00	h	1.1E+00 r		0	0.10	60-34-4	Methyl hydrazine Page 8 of 13	4.4E-01 ca 2.2E+00 ca 6.1E-03 ca 6.1E-02 ca

Key: i=IRIS n=NCEA h=HEAST x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=\$OIL SATURATION max=CEILING LIMIT "(where: nc < 100X ca) ""(where: nc < 100X ca) FOR PLANNING PURPOSES CONTAMINANT PRELIMINARY REMEDIATION GOALS (PRGs) SOIL SCREEN TOXICITY INFORMATION SFo RfDo O abs CAS No Soil (mg/kg) Soil (mg/kg) (ug/m/3) (ma/kg-d) 1/(ma/kg-d) 1/(mg/kg-d): (mg/kg-d) nc 2.9E+03 8.0E-02 2.3E-02 108-10-1 Methyl isobutyl ketone 7.9E+02 8.3E+01 Methyl Mercaptan 3.5E+01 nc 5.0E+02 2.1E+00 nc 2.1E+01 74-93-1 5.7F-04 5.7E-04 n 0 0.10 Methyl methacrylate 2.2E+03 2.7E+03 7.3E+02 nc 1.4E+03 1.4F+00 2 0F-01 i 1 80-62-6 2-Methyl-5-nitroaniline 1.5E+01 7.5E+01 ca 2.0E+00 3.3E-02 3.3E-02 0 0.10 99-55-8 Methyl parathion 1.5E+01 2.2E+02 9.1E-01 9.1E+00 298-00-0 nc 2.5E-04 2.5E-04 r 0 0.10 2-Methylphenol 3.1E+03 4:4E+04 1.8E+02 1.8E+03 2E+01 8E-01 5.0E-02 5.0E-02 0.10 95-48-7 r 0 3-Methylphenol 3.1E+03 1.8E+03 5 0F-02 5.0E-02 0.10 108-39-4 r 0 1.8E+02 4-Methylphenol 3.1E+02 4.4E+03 1.8E+01 106-44-5 5.0E-03 5.0E-03 r 0 010 7.3E+02 993-13-5 Methyl phosphonic acid 1.2E+03 1.8E+04 7.3E+01 2.0E-02 2.0E-02 r 0 0 t0 Methyl styrene (mixture) 1.3E+02 5.6E+02 4.2E+01 6.0E+01 6.0E-03 1.1E-02 25013-15-4 6.8E+02 6.8E+02 2.6E+02 4.3E+02 98-83-9 Methyl styrene (alpha) 7.0E-02 h 7.0E-02 r 1 Methyl tertbutyl ether (MTBE) 3.1E+03 nc 2.0E+01 8.6E-01 1634-04-4 5.5E+02 51218-45-2 Metolacior (Dual) 1.5E-01 1.5E-01 r 0 0.10 nc 2.2E+04 nc 9.1E+01 21087-64-9 Metribuzin 1.5E+03 2.5E-02 2.5E-02 r O 0.10 Mirex 2.7E-01 1.4E+00 ca 3.7E-03 2385-85-5 1.8E+00 x 2.0E-04 2.0E-04 r 0 0.10 1.2E+02 пс Molinate 2.0E-03 r 0 2212-67-1 3.9E+02 nc 1.0E+04 1.8E+02 7439-98-7 Molybdenum 5 0F-03 0 Monochloramine 6.1E+03 8.8E+04 3.7E+02 3:6E+03 10599-90-3 1 0F-01 1.0F-01 h 0 010 1.2E+02 1.8E+03 7.3E+01 Naled nc 2.0E-03 2 0F-03 r 0 1010 300-76-5 nc 8.8E+04 Napropamide 6.1E+03 3.7E+02 3.6E+03 nc nc nc 1.0E-01 15299-99-7 Nickel (soluble salts) 1.6E+03 nc 4.1E+04 7.3E+02 1E+02 7E+00 2.0E-02 0 7440-02-0 "CAL-Modified PRG" (PEA, 1994) 1.5E+02 Nickel refinery dust 8.0E-03 8 4E-01 0 Nickel subsulfide 1.1E+04 4.0E-03 12035-72-2 ca ca 1.7E+00 Nitrapyrin 1.3E+03 5.5E+00 1.5E-03 1929-82-4 1.5E-03 1.0E+04 14797-55-8 Nitrate Tap Water PRG Based on Infant NOAEL (see IRIS) 3.6E+03 Nitric Oxide 7.8E+03 1.0E+05 пс 10102-43-9 1.0E-01 1.0E+03 Nitrite 14797-65-0 Tap Water PRG Based on Infant NOAEL (see IRIS) 2.1E+00 2-Nitroaniline 3.5E+00 5.0E+01 2:1E-01 88-74-4 nc пс 5.7E-05 5.7E-05 7E-03 Nitrobenzene 2.0E+01 1.1E+02 2.1E+00 3.4E+00 1E-01 5.7E-04 98:95-3 5.0E-04 Nitrofurantoin 4.3E+03 67-20-9 3.2E-01 7.2E-04 ca 4.5E-02 1.6E+00 0 0.10 59-87-0 Nitrofurazone 1.5E+00 h 9.4E+00 h Nitroglycerin 3.5E+01 ca 1.8E+02 1.4E-02 n 1.4E-02 0.10 55-63-0 Nitroguanidine 6.1E+03 8.8E+04 556-88-7 пс 1.0E-01 r 0 0.10 1 0E-01 4.9E+02 7.0E+03 2.9E+01 nc 2.9E+02 4-Nitrophenol nc 8.0E-03 8.00E-03 r 0 0.10 100-02-7 2-Nitropropane 7.2E-04 1.2E-03 ca 5.7E-03 9.4E+00 5.7E-03 79-46-9 9.4E+00 1.2E-03 ca 2.0E-03 N-Nitrosodi-n-butylamine 5.4E+00 5.6E+00 924-16-3 204 ca 8.8E-01 2.4E-02 1.7E-01 2.4E-03 N-Nitrosodiethanolamine Ç ca 2 8F+00 2.8E+00 0 0.10 1116-54-7 3.2E-03 1.6E-02 1.5E+02 55-18-5 N-Nitrosodiethylamine 4.5E-05 4.5E-04 1.5E+02 0.10 N-Nitrosodimethylamine 9.5E-03 4.8E-02 62-75-9 5.1E+01 4.9E+01 0 0.10 N-Nitrosodiphenylamine 9.9E+01 ca 5.0E+02 1.4E+00 1.4E+01 1E+00 6E-02 ça 4 9E-03 4.9E-03 0 < 0.10 86-30-6 N-Nitroso di-n-propylamine 6.9E-02 3.5E-01 9.6E-04 9.6E-03 5E-05 2E-06 0 0.10 621-64-7 7.0F+00 7.0E+00 N-Nitroso-N-methylethylamine 2.2E-02 2.2E+01 0.10 10595-95-6 -2 2E+01-3.2E-02 N-Nitrosopyrrolidine 2.3E-01 1.2E+00 3.1E-03 930-55-2 ca 2.1E+00 2.1E+00 0 0.10 m-Nitrotoluene 3.7E+02 1.00E+03 3.7E+01 6.1E+01 99-08-1 1,0E-02 1.0F-02 o-Nitrotoluene nc 1.00E+03 · sat 99-08-1 1.0E-02 1.0E-02 p-Nitrotoluene 3.7E+02 nc 1.00E+03 3.7E+01 6.1E+01 sat nc nc 1.0E-02 1.0E-02 r 1 99-99-0 2.4E+03 nc 3.5E+04 1.5E+02 1.5E+03 4.0E-02 4.0E-02 r 0 0.10 27314-13-2 Norflurazon nc пс Page 9 of 13

					FC)RP	LANNING PURP	OSES	
	TOXICITY	INFOR M	ATION				CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) SOIL SCREENING	o i El/El c
4.66	7.00	Zero entre entre de		408775722875298	skin .		1 m	Migration to	
SFa /(mg/kg-d)	· RfDo	SFI 1//ma/ka d\	RfDi	Q	11700 to 2170 to 2000 to 2000 to	ÇAŞ No.	and the second of the second o	Residential Industrial Ambien(Air Tep Water DAF 20 1 -	DÁF IS
/(iiig/kg-u)	7.0E-04	1/(mg/kg-d)	(mg/kg-d 7.0E-04		soils	05500.40.0	INLeCtor		(mg/kg)
	3.0E-03	:	3.0E-03	r 0 r 0		85509-19-9 32536-52-0	NuStar Octabromodiphenyl ether	4.3E+01 nc 6.2E+02 nc 2.6E+00 nc 2.6E+01 nc	
	5.0E-02	i	5.0E-03	r u		32536-52-U 2691-41-0	Octabiornodiprierryi ether Octabiornodiprierryi ether Octabiornodiprierryi ether	1.8E+02	
	2.0E-03	, 	2.0E-03	r 0		152-16-9	Octamethylpyrophosphoramide		
	5.0E-02	i,	5.0E-02	r 0		19044-88-3	Oryzalin :	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	5.0E-03	i	5.0E-02	r 0		19666-30-9	Oxadiazon	0.45.00	
	2.5E-02	i	2.5E-02	r O		23135-22-0	Oxamy		
	3.0E-03	i	3.0E-03	r 0		42874-03-3	Oxyfluorfen	1.05:00	
	1.3E-02	i	1.3E-02	r 0-		76738-62-0	Paclobutrazol	7.00.00	
	4.5E-03	·	4.5E-03	r 0	,	4685-14-7	Paraguat	7.77.100	
	6.0E-03	1	6.0E-03	r 0		56-38-2	Parathion	0.75.00	
	5.0E-02	1	5.0E-02	r 0		1114-71-2	Pebulate	3.7E+02 nc 5.3E+03 nc 2.2E+01 nc 2.2E+02 nc 3.1E+03 nc 4.4E+04 nc 1.8E+02 nc 1.8E+03nc	
	4.0E-02		4.0E-02	r 0		40487-42-1	Pendimethalin		
3E-02 h		2.3E-02	1.02.02	. 0		87-84-3	Pentabromo-6-chloro cyclohexane	0.45.00	
	2.0E-03	i	2.0E-03	г 0		32534-81-9	Pentabromodiphenyl ether	4.05.00	
	8.0E-04	i	8.0E-04	г 0	0.10	608-93-5	IPentachlorobenzene		
6E-01 h	3.0E-03	i 2.6E-01	r 3.0E-03	. 0		82-68-8	Pentachloronitrobenzene	100	
2E-01 i	3.0E-02		r 3.0E-02	r 0		87-86-5	Pentachlorophenol		4E 02
	5.0E-04	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	. 0.02.02	0	0.20	7601-90-3	Perchlorate	0.01-04	1E-03
	5.0E-02	ì	5.0E-02	r O	0.10	52645-53-1	Permethrin	245.00	
	2.5E-01		2.5E-01	r 0	0.10	13684-63-4	Phenmedipham	4.55.04	
	6.0E-01		6.0E-01	r 0	0.10	108-95-2	IPhenol		EL TOO
	2.0E-03 r	,	2.0E-03	r 0	0.10	92-84-2	Phenothiazine	105.00	5E+00
	6.0E-03	i	6.0E-03	1 0	0.10	108-45-2	m-Phenylenediamine	0.42.00	
	1.9E-01		1.9E-01	r 0	0.10	106-50-3	Ip-Phenylenediamine		
	8.0E-05		8.0E-05	г 0	0.10	62-38-4	Phenylmercuric acetate	105.00	
9E-03 h	0.02 00	1.9E-03	r.	. 0	0.10	90-43-7	2-Phenylphenol	4.9E+00 nc 7.0E+01 nc 2.9E-01 nc 2.9E+00 nc 2.5E+02 ca 1.3E+03 ca 3.5E+00 ca 3.5E+01 ca	
	2.0E-04		2.0E-04	r 0		298-02-2	IPhorate		
	2.0E-02 i		2.0E-02	r 0	0.10	732-11-6	Phosmet	1.2E+01 nc 1.8E+02 nc 7.3E+01 nc 7.3E+00 nc 1.2E+03 nc 1.8E+04 nc 7.3E+01 nc 7.3E+02 nc	
	3.0E-04	1	8.6E-05	i 0		7803-51-2	Phosphine	1.8E+01 nc 2.6E+02 nc 3.1E-01 nc 1.1E+01 nc	
			2.9E-03			7664-38-2	Phosphoric acid	1.0E+01 nc	
	2.0E-05		2.52.55	. 0		7723-14-0	Phosphorus (white)	1.65.00	
	1.0E+00 h	1	1.0E+00	r 0	0.10	100-21-0	Ip-Phthalic acid		
	2.0E+00		3.4E-02	h 0	0.10	85-44-9	Phthalic anhydride		
	7.0E-02		7.0E-02	r 0	0.10	1918-02-1	Picloram	105.00	
	1.0E-02 i		1.0E-02	r 0	0.10	23505-41-1	Pirimiphos-methyl		
9E+00 h		8.9E+00	г 7.0E-06	r 0	0.10	2000 41-1	Polybrominated biphenyls		
0E+00 i		2.0E+00	i	0	0.14	1336-36-3	Polychlorinated biphenyls (PCBs)	그 그렇게 살아 이 이유를 잃었다. 이 이 경험 경우는 이 경험 경투는 이 점점 이 없는 것이다.	
0E-02 i	7.0E-05	7.0E-02	i 7.0E-05	r O	0.14	12674-11-2	Aroclor 1016		garan i
0E+00 i	.,02.00	2.0E+00	i	0	0.14	11104-28-2	Aroclor 1221		97 - 13 A 3
i 00+⊒0		2.0E+00		0	0.14	11141-16-5	Aroclor 1221		
DE+00 i		2.0E+00	i	0	0.14	53469-21-9	Aroclor 1232		
DE+00 i		2.0E+00		0	0.14	12672-29-6	Aroclor 1248	3.95 38 32 38 32 38 32 38 32 38 32 38 32 38 32 38 32 38 32 38 38 38 38 38 38 38 38 38 38 38 38 38	
0E+00 i	2.0E-05 i	2.0E+00	i 2.0E-05	: r 0	0.14	11097-69-1	Aroclor 1254	- (2) 솔프, 강마 보고 되고 마음, 프로젝션 (P. 1975 -), 전에프트 (2C. H. 1977 -) - (조리 (프로젝션 1976 - 1974) - H. 1975 -) - (H. 1	1. 1. 1. 1. 1
0E+00 i	2.92-00	2.0E+00	i	0	0.14	11096-82-5	Aroclor 1260		
		1.02.00			0.13	.1000-02-0	Polynuclear aromatic hydrocarbons (PAHs)	2.2E-01 ca 1.0E+00 ca 3.4E-03 ca 3.4E-02 ca	
	6.0E-02 i		6.0E-02	r t	5.15	83-32-9	Acenaphthene	3.7E+03 nc 3.8E+04 nc 2.2E+02 nc 3.7E+02 nc 6E+02	3E+01
	3.0E-01 i		3.0E-01	r 1		120-12-7	A _ 11	02.02	
	5.56-01 1		3.04-01	, ,		120-12-1	Anthracene Page 10 of 13.	2.2E+04 nc 1.0E+05 max 1.1E+03 nc 1.8E+03 nc 1 1E+04	6E+02

	I-NOLA II-HE	X-VVIII	DIVATAIN	5 Otriel				EXTRAPOLATION CA=CANCER PRG NC=NONCANCER PRG LANNING PURPO				1.5						17.
						ΓU	IK P	EANNING FURFO	JJE	J	145	ifi.						
	TOXICITY	INFORM	ATION					CONTAMINANT	PREI	LIMIN	ARY REN	IEDIA	TION GO	ALS	(PRGs)	SOIL	SCREENIN	
	TOXIOITI	7.5				skin			7.5		Commence of the Arriva	(13)	Ambient Ar			1343	Migration to	Ground Water DAF 1
SFo .	RfDo	10 C C C C C C C C C C C C C C C C C C C	Carrier Committee	Di			CAS No.		Residentia Soll (mg/k		o Soil (mg/l	4	Ambient Air (ug/m/3)		(ug/l)	118	(mg/rg)	(mg/kg)
(mg/kg-d) /	(mg/kg-d)	3.1E-01	(mg/	kg-a)		soils 0.13	56-55-3	Benz[a]anthracene	6.2E-01	ca ca	2.9E+00	CB.	2.2E-02	ca	9:2E-02	ca	2E+00	8E-02
7.3E-01 n 7.3E-01 n		3.1E-01 3.1E-01	n n			0.13	205-99-2	Benzo[b]fluoranthene	6.2E-01	ca	2.9E+00	ca	2:2E-02	ca	9.2E-02	са	5E+00	2E-01
7.3E-01 n		3.1E-01	0 .		_	0.13	207-08-9	Benzo[k]fluoranthene	6.2E+00	ca .	2.9E+01	ca	2.2E-01	ca	9.2E-01	ca	5E+01	2E+00
7.52-02		0.12-02						"CAL-Modified PRG" (PEA, 1994)	6.1E-01		127° 50		R 1 1 1 1 1 1 1		1.50			
7.3E+00 i		3.1E+00	n		. 0	0.13	50-32-8	Benzo[a]pyrene "CAL-Modified PRG" (PEA, 1994)	6.2E-02	ca	2.9E-01	ca	2.2E-03	са	9.2E-03 1.5E-03	ca	8E+00	4E-01
7.3E-03 n)	3.1E-03	n		0	0.13	218-01-9	Chrysene	6.2E+01	ca.	2.9E+02	ca	2.2E+00	ca	9.2E+00	са	2E+02	8E+00
								"CAL-Modified PRG" (PEA, 1994)	6.1E+00		0.05.04	,	2 25 02		0.25.02	10-2	2E+00	8E-02
7.3E+00 n		3.1E+00	n			. 0.13	53-70-3	Dibenz[ah]anthracene	6.2E-02	ca	2.9E-01	. ca	2.2E-03 1.5E+02	ca	9.2E-03 1.5E+03	nc	4E+03	2E+02
	4.0E-02	i			r 0	0.13	206-44-0	Fluoranthene	2.3E+03 2.6E+03	nc nc	3.0E+04 3.3E+04	nc nc	1.5E+02 1.5E+02	nc	2.4E+02	nc	6E+02	3E+01
	4.0E-02	i		E-02	r 1		86-73-7	Fluorene Indeno[1,2,3-cd]pyrene	6.2E-01	nc ca.	3.3E+04 2.9E+00	nc ca	2.2E-02	nc .ca	9.2E-02	ca	1E+01	7E-01
7.3E-01 n	 	3.1E-01	n :		0	0,13	193-39-5	Naphthalene	5.6E+01	nc .	1.9E+02	ńc	3.1E+00	nc	6.2E+00	nc	8E+01	4E+00
	2.0E-02	i		E-04	i 1		91-20-3 129-00-0	Pyrene	2.3E+03	nc	5.4E+04	ñc	1.1E+02	nc	1.8E+02	nc	4E+03	2E+02
1.50.04	3.0E-02	i i 1.5E-01		E-02 E-03	r t r Ó	0.10	129-00-0 67747-09-5	Prochloraz	3.2E+00	ca	1.6E+01	ca	4.5E-02		4.5E-01	ca	1. Jan. 1. S. J.	. J. 1885
1.5E-01 i	9.0E-03 6.0E-03	i i.3E-Ul		E-03	r 0	0.10	26399-36-0	Profluralin	3.7E+02	nc	5.3E+03	nč	2.2E+01	·nc	2.2E+02	nc		
	1.5E-02	i i		E-03	10	0.10	1610-18-0	Prometon	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc		
	4.0E-03	i		E-03		0.10	7287-19-6	Prometryn	2.4E+02	nc -	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc		2 2 2 2
	7.5E-02	i		E-02	r O	0.10	23950-58-5	Pronamide	4.6E+03	nc	6.6E+04	nc	2.7E+02	nc	2.7E+03	nc		2 18 Av 2
	1.3E-02	i		E-02	r 0	0.10	1918-16-7	Propachlor	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
	5.0E-03	i	5.0	E-03	r 0	0.10	709-98-8	Propanil	3.1E+02	nc	4.4E+03		1.8E+01	nc -	1.8E+02	. nc	a salah salah salah	
	2.0E-02	i	2.0	E-02	r 0	0.10	2312-35-8	Propargite	1.2E+03	nc	1.8E+04	пс	7.3E+01	nc	7.3E+02	nc		
	2.0E-03	į	2.0	E-03	r 0	0.10	107-19-7	Propargyl alcohol	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
	2.0E-02	i	2.0	E-02	r 0	0.10	139-40-2	Propazine	1.2E+03	nc	1.8E+04	nc	7.3E+01		7.3E+02	nc	e syria e al ar	
	2.0E-02	i	2.0	E-02	г 0	0.10	122-42-9	Propham	1.2E+03	nc "("	1.8E+04 1.1E+04	nc	7.3E+01 4.7E+01	nc nc	7.3E+02 4.7E+02	nc		
	1.3E-02	i		E-02	r 0	0.10	60207-90-1	Propiconazole	7.9E+02 1.6E+02	nc nc	5.2E+02	nc nc	4.7E+01	nc	6.6E+02	nc nc		
	1.0E-01	<u>i</u>		E-01	i 1		98-82-8	Isopropylbenzene (Cumene)	1.6E+02	nc nc	2.4E+02	nc ·	3.7E+01	nc	6.1E+01	nc		
		n		E-02	r 1	A	103-65-1	In-Propylbenzene Propylene glycol	1.4E+02	max		max	7.3E+04	nċ	7.3E+05	nc		
	2.02.0	h		E+01	r 0	0.10	57-55-6 111-35-3	Propylene glycol, monoethyl ether	4.3E+04	nax	1.0E+05	max	2.6E+03	nc	2.6E+04	nc-nc-	tak in in in	
	7.0E-01	n		E-01	r 0	0.10	107-98-2	Propylene glycol, monomethyl ether	4.3E+04	nc	1.0E+05	max	2.1E+03	nc	2.6E+04	nc		
A = 04	7.0E-01	h r 13F-02		E-01 E-03	i t	0.10	75-56-9	Propylene grycor, monometryr carer	1.9E+00	ca*	9.1E+00	ca*	5.2E-01	ca*	2.2E-01	ca		
2.4E-01 i	i 8.6E-03 2.5E-01	r 1.3E-02		E-03 E-01	r O	0.10	81335-77-5	Pursuit	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc.	st. to war to	
***	2.5E-01	<u> </u>		E-02	r 0	0.10	51630-58-1	TPydrin Trydrin	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
	1.0E-03	i i		E-03	r 0	0.10	110-86-1	Pyridine	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
	5.0E-04	i		E-04	г 0	0.10	13593-03-8	Quinalphos	3.1E+01	пс	4.4E+02	nc	1.8E+00	nc		nc	1 - 2003/03/02/03	
1.2E+01 I	h	1.2E+01	r		. 0	0.10	91-22-5	Quinoline	4.1E-02	ca	2:1E-01	ça	5.6E-04	ca	5.6E-03	Ca	2 4 2	
1.1E-01	i 3.0E-03	i 1.1E-01	r 3.0	E-03	r 0,	0.10	121-82-4	RDX (Cyclonite)	4.4E+00		2.2E+01	ca	6.1E-02	ca	6.1E-01	ca	1.0000	Specifical Science
	3.0E-02	14	3.0	E-02	r 0	0.10	10453-86-8	Resmethrin	1.8E+03		2.6E+04	nc.	1.1E+02	nc	1.1E+03	nc		39 Y 15 64
		L.	5.0	E-02	r O	0:10	299-84-3	Ronnel	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03 1.5E+02	nc		
	5.0E-02	n						Rotenone	2.4E+02	- nc	3.5E+03	nc.	1.5E+01	nc.				
· · · · · · · · · · · · · · · · · · ·		i i		0E-03	г О	.0.10	83-79-4	事态运荡的 "我一切,我看见你!""不知道,我们不知道,我只有一块,我们就是好了多么能够好。"	4 55 00				100	- D - E		nc		
	5.0E-02	n i		0E-03 5E-02		0.10	78587-05-0	Savey	1.5E+03	4.5	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
	5.0E-02 4.0E-03 2.5E-02 5.0E-03	i i			r 0		78587-05-0 7783-00-8	Savey Selenious Acid	3.1E+02	nc	2.2E+04 4.4E+03	nc	100	- D - E	9.1E+02 1.8E+02	nc nc	5F+00	3E-01
	5.0E-02 4.0E-03 2.5E-02 5.0E-03 5.0E-03	n i i			r 0 0	0.10	78587-05-0 7783-00-8 7782-49-2	Savey Selenious Acid Selenium	3.1E+02 3.9E+02	nc nc	2.2E+04 4.4E+03 1.0E+04	nc nc	100	- D - E	9.1E+02	nc	5E+00	3E-01
	5.0E-02 4.0E-03 2.5E-02 5.0E-03 5.0E-03 5.0E-03	n i i	2.	5E-02	r 0 0 0	0.10 0.10	78587-05-0 7783-00-8 7782-49-2 630-10-4	Savey Selenious Acid Selenium Selenourea	3.1E+02 3.9E+02 3.1E+02	nc nc nc	2.2E+04 4.4E+03 1.0E+04 4.4E+03	nc nc nc	9.1E+01	- D - E	9.1E+02 1.8E+02 1.8E+02 1.8E+02	nc nc nc	5E+00	3E-01
	5.0E-02 4.0E-03 2.5E-02 5.0E-03 5.0E-03	i i i i h	2.		r 0 0	0.10	78587-05-0 7783-00-8 7782-49-2	Savey Selenious Acid Selenium	3.1E+02 3.9E+02	nc nc nc	2.2E+04 4.4E+03 1.0E+04	nc nc	100	nc	9.1E+02 1.8E+02 1.8E+02	nc nc nc	5E+00 3E+01	3E-01 2E+00

Region 9 RBC

ey. I-INIO	September 1		Mark 0-00	on a contradiction?	Charles Andrews	Concernation of South Conference and	anne de la companya del companya de la companya de la companya del companya de la companya del la companya del la companya de	PRG_sat=SOIL SATURATION_max=CEILING_LIMIT_*(where:_nc < 100X ca) **(where:_nc < 10X ca)								
		(1) (1) (1)			F()RP	LANNING PURP	OSES								
					. •											
	TOXICITY	INFORMAT	ION				CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs) SOIL SCREENING LEVELS								
S. Missia	- 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10	1. S. S. S. W.			skin			Migration to Ground We Residential Industrial Ambient Ar Tap Water DAF 20 DAF 1								
SFo	RfDo .	SFI	10 C 10 C 10 C 10 C 10 C 10 C 10 C 10 C		abs	CAS No.		Residential Industrial Ambient Ar Tap Water DAF 20 DAF 1 Soil (mg/kg) Soil (mg/kg) (ug/m^3) (ug/l) (mg/kg) (mg/kg)								
ng/kg-d)	(mg/kg-d)	1/(mg/kg-d)	(mg/kg-d)		soils	22222 22 2		2.4E+02 nc 3.5E+03 nc 1.5E+01 nc 1.5E+02 nc								
	4.0E-03		4.0E-03	ι 0	0.10	26628-22-8	Sodium azide Sodium diethyldithiocarbamate	1.8E+00 ca 9.1E+00 ca 2.5E-02 ca 2.5E-01 ca								
.7E-01 I		2.7E-01 r	3.0E-02	r 0	0.10	148-18-5 62-74-8	Sodium fluoroacetate	1.2E+00 nc 1.8E+01 nc 7.3E-02 nc 7.3E-01 nc								
	2.0E-05	<u></u>	2.0E-05	r 0	0.10	13718-26-8	ISodium metavanadate	16.1E+01 nc 8.8E+02 nc 3.7E+00 nc 3.6E+01 nc								
	1.0E-03 h	1	1.0E-03	r 0	0.10	7440-24-6	Strontium, stable	4.7E+04 nc 1.0E+05 max 2.2E+04 nc								
	6.0E-01		3.0E-04	0 r 0	0.10	7440-24-0 57-24-9	Strychnine	1.8E+01 nc 2.6E+02 nc 1.1E+00 nc 1.1E+01 nc								
	3.0E-04 i 2.0E-01 i		2.9E-01	i 1	0.10	100-42-5	Styrene	1.7E+03 sat 1.7E+03 sat 1.1E+03 nc 1.6E+03 nc 4E+00 2E-01								
			2.9E-01 2.5E-02	r O	0.10	88671-89-0	Systhane	1.5E+03 nc 2.2E+04 nc 9.1E+01 nc 9.1E+02 nc								
55.05	2.5E-02	455.05	2.5E-U2	1 0	0.10	1746-01-6	2.3.7.8-TCDD (dioxin)	3.9E-06 ca 2.7E-05 ca 4.5E-08 ca 4.5E-07 ca								
.5E+05	7.0E-02 i	1.5E+05 h	7.0E-02	r 0	0.03	34014-18-1	Tebuthiuron	4.3E+03 nc 6.2E+04 nc 2.6E+02 nc 2.6E+03 nc								
			7.0E-02 2.0E-02	r U	0.10	3383-96-8	Temephos	1.2E+03 nc 1.8E+04 nc 7.3E+01 nc 7.3E+02 nc								
	2.0E-02 F	1	1.3E-02	r O	0.10	5902-51-2	Terbacil	7.9E+02 nc 1.1E+04 nc 4.7E+01 nc 4.7E+02 nc								
	2.5E-05 h		2.5E-05	r 0	0.10	13071-79-9	Herbutos	1.5E+00 nc 2.2E+01 nc 9.1E-02 nc 9.1E-01 nc								
	2.5E-05 F	·	1.0E-03	r 0	0.10	886-50-0	Terbutryn	6.1E+01 nc 8.8E+02 nc 3.7E+00 nc 3.6E+01 nc								
	3.0E-04		3.0E-04	r 0	0.10	95-94-3	1,2,4,5-Tetrachlorobenzene	1.8E+01 nc 2.6E+02 nc 1.1E+00 nc 1.1E+01 nc								
2.6E-02	i 3.0E-02 i	2.6E-02 i	3.0E-02	r f	0.10	630-20-6	11,1,1,2-Tetrachloroethane	3.0E+00 ca 7.0E+00 ca 2.6E-01 ca 4.3E-01 ca								
.0E-02	i 6.00E-02 r		6.00E-02	r 1		79-34-5	1,1,2,2-Tetrachloroethane	3.8E-01 ca 9.0E-01 ca 3.3E-02 ca 5.5E-02 ca 3E-03 2E-04								
5.2E-02 (2.0E-03 n	1.1E-01	n 1		127-18-4	Tetrachloroethylene (PCE)	5.7E+00 ca 1.9E+01 ca 3.3E+00 ca 1.1E+00 ca 6E-02 3E-03								
.ZE-02 (1.02-02	2.00-03 11	1.16-01			121-10-4	"CAL-Modified PRG" (PEA, 1994)	3.2E-01								
	3.0E-02 i		3.0E-02	r 0	0.10	58-90-2	2,3,4,6-Tetrachlorophenol	1.8E+03 nc 2.6E+04 nc 1.1E+02 nc 1.1E+03 nc								
.0E+01		2.0E+01 r	3.00-02	0	0.10	5216-25-1	p,a,a,a-Tetrachlorotoluene	2.4E-02 ca 1.2E-01 ca 3.4E-04 ca 3.4E-03 ca								
	h 3.0E-02	2.4E-02 r	3.0E-02	r 0		961-11-5	Tetrachlorovinphos	2.0E+01 ca* 1.0E+02 ca 2.8E-01 ca 2.8E+00 ca								
2.4E-02	5.0E-04	1 2,46-02 1	5.0E-04	r 0	0.10	3689-24-5	Tetraethyldithiopyrophosphate	3.1E+01 nc 4.4E+02 nc 1.8E+00 nc 1.8E+01 nc								
'.6E-03		n 6.8E-03 n	8.6E-02	n 0	0.10	109-99-9	Tetrahydrofuran	6.4E+01 ca 3.2E+02 ca 9.9E-01 ca 8.8E+00 ca								
,6E-03	7.0E-05	1 6.62-03 11	0.00-02	0	0.10	1314-32-5	Thallic oxide	5.5E+00 nc 1.4E+02 nc 2.6E+00 nc								
	9.0E-05			0		563-68-8	Thallium acetate	7.0E+00 nc 1.8E+02 nc 3.3E+00 nc 7E-01 4E-01								
	8.0E-05	' i	•	0.		6533-73-9	Thallium carbonate	6.3E+00 nc 1.6E+02 nc 2.9E+00 nc 7E-01 4E-01								
	8.0E-05			0		7791-12-0	Thallium chloride	6.3E+00 nc 1.6E+02 nc 2.9E+00 nc 7E-01 4E-01								
	9.0E-05	•		0		10102-45-1	Thallium nitrate	7.0E+00 nc 1.8E+02 nc 3.3E+00 nc 7E-01 4E-01								
	9.0E-05	·		0		12039-52-0	Thallium selenite	7.0E+00 nc 1.8E+02 nc 3.3E+00 nc 7E-01 4E-01								
	8.0E-05	<u> </u>		0		7446-18-6	Thallium sulfate	6.3E+00 nc 1.6E+02 nc 2.9E+00 nc 7E-01 4E-01								
	1.0E-02	· i	1.0E-02	r O	0.10	28249-77-6	Thiobencarb	6.1E+02 nc 8.8E+03 nc 3.7E+01 nc 3.6E+02 nc								
	1.0E-01 /	n	1.0E-01	r 0	0.10	N/A	Thiocyanate	6.1E+03 nc 1.0E+05 max 3.7E+02 nc 3.6E+03 nc								
	3.0E-04	h	3.0E-04	r 0	0.10	39196-18-4	Thiofanox	1.8E+01 nc 2.6E+02 nc 1.1E+00 nc 1.1E+01 nc								
	8.0E-02	i	8.0E-02	г 0	0.10	23564-05-8	Thiophanate-methyl	4.9E+03 nc 7.0E+04 nc 2.9E+02 nc 2.9E+03 nc								
	5,0E-03	· i	5.0E-03	r 0		137-26-8	Thiram	3.1E+02 nc 4.4E+03 nc 1.8E+01 nc 1.8E+02 nc								
	6.0E-01	h		0			Tin (inorganic, see tributyltin oxide for organic tin)	4.7E+04 nc 1.0E+05 max 2.2E+04 nc								
	2.0E-01	 i	1.1E-01	h 1		108-88-3	Toluene	5.2E+02 sat 5.2E+02 sat 4.0E+02 nc 7.2E+02 nc 1E+01 6E-01								
.2E+00		3.2E+00 r		0	0.10	95-80-7	Toluene-2,4-diamine	1.5E-01 ca 7.7E-01 ca 2.1E-03 ca 2.1E-02 ca								
	6.0E-01		6.0E-01	r 0	0.10	95-70-5	Toluene-2.5-diamine	3.7E+04 nc 1.0E+05 max 2.2E+03 nc 2.2E+04 nc								
	2.0E-01 f		2.0E-01	r 0	0.10	823-40-5	Toluene-2,6-diamine	1.2E+04 nc 1.0E+05 max 7.3E+02 nc 7.3E+03 nc								
2E-01	2.0C-01 1	" 2E-01 r	2.02-01	0	0.10	106-49-0	p-Toluidine	2.6E+00 ca 1.3E+01 ca 3.5E-02 ca 3.5E-01 ca								
.1E+00	· · · · · · · · · · · · · · · · · · ·	1.1E+00 i		0		8001-35-2	Toxaphene	4.4E-01 ca 2.2E+00 ca 6.0E-03 ca 6.1E-02 ca 3E+01 2E+00								
1.12700	7.5E-03	1.1E+00 T	7.5E-03	٠ 0	0.10	66841-25-6	Tralomethrin	4.6E+02 nc 6.6E+03 nc 2.7E+01 nc 2.7E+02 nc								
	1,3E-03	i	1.3E-02	r 0		2303-17-5	Triallate	7.9E+02 nc 1.1E+04 nc 4.7E+01 nc 4.7E+02 nc								
	1.0E-02	i	1.0E-02	r 0	0.10	82097-50-5	Triasulturon	6.1E+02 nc 8.8E+03 nc 3.7E+01 nc 3.6E+02 nc								
	5.0E-03	· i	5.0E-02	r 0	0.10	615-54-3	1,2,4-Tribromobenzene	3.1E+02 nc 4.4E+03 nc 1.8E+01 nc 1.8E+02 nc								
	3.0E-03		J.UL-UJ	0		56-35-9	Tributyltin oxide (TBTO) Page 12 of 13	1.8E+01 nc 2.6E+02 nc 1.1E+01 nc								

TABLE 1
DEQ Portland Harbor Apparent Baseline Values

100 CONTRACTOR

1731,147 301,187

Analyte	Baseline Value	Unit	ti Mili Di Cale, metodon
Fluorene	125	PPB 715.	Marie en en en en en en en en en en en en en
Indeno(1,2,3-c,d)pyrene	225	PPB	
	200	PP8	
Naphthalene	700	PPB	and the second of the second
Phenanthrene	osa e a a	e e service .	
Pyrene	700	PPB	
High Molecular Weight PAH	2400	PPB	
Low Molecular Weight PAH	700	PPB	AL PRODUCTION OF THE PRODUCTIO
Other ABNs.	en generalis in in		reight side
2-Methylnaphthalene	150	PPB	in the second of
4-Methylphenol	680	PPB	THE REAL PROPERTY OF
Anthracene	150	PPB	the street of th
Benzoic acid	200	PPB	
Benzyl alcohol	20	PPB	tangs
Bis(2-ethylhexyl) phthalate	390	PPB	
Butyl benzyl phthalate	20	PPB	Settle 1946 April
Di-n-butyl phthalate	20	PPB	10 46 数 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
Di-n-octyl phthalate	20	PPB	
Dibenzofuran	100	PPB	1
Dimethyl phthalate	20	PPB	
Pentachlorophenol	97	PPB	
Phenol	20	PPB	
Pesticides/PCBs			1
2,4-D	3.3	1	
2,4-Dichlorophenoxybutyric acid	5		
Total of 6 isomers: pp,op-DDT,-DDD,-DDE	220	<u> </u>	<u> </u>
Total Polychlorinated Biphenyls	180	PPB	
Miscellaneous			1
Carbazole	100		
Total organic carbon	1 2	PCT]

WATER QUALITY CRITERIA SUMMARY (Applicable to all Basins)¹

The concentration for each compound listed in this chart is a criteria or guidance value* not to be exceeded in waters of the state for the protection of aquatic life and human health. Specific descriptions of each compound and an explanation of values are included in Quality Criteria for Water (1986). Selecting values for regulatory purposes will depend on the most sensitive beneficial use to be protected, and what level of protection is necessary for aquatic life and human health.

<u>and a supplied of the supplind of the supplied of the supplied of the supplied of the supplin</u>				tration in Mic Protection of				tion in Units Per tion of Human F	
Compound Name (or Class)	Priority Pollutant	Carcinogen	Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria	Water and Fish Ingestion	Fish Consumption Only	Drinking Water M.C.L.
ACENAPTHENE	Y	. Ń	*1,700.	راپير .520*	*970	*710.		المستوارة ويالعال	game as ter
ACROLEIN	Y	N	*68.	*21.	*55.	Security of	320.ug	780.ug	
ACRYLONITRILE	. Y	Y	*7,550.	*2,600.			0.058ug**	0.65ug**	
ALDRIN	Y	Υ Υ	3.0		1.3		0.074ng**	0.079ng**	
ALKALINITY	N	N		20,000	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Kalandi Dependent in help agent in		e ar egga, it.
AMMONIA	N	N					EE DOCUMENT USEP - SEE DOCUMENT US		
ANTIMONY	Υ Υ	N	*9,000	*1,600.	<u> </u>		146.ug	45,000.ug	
ARSENIC	Ý	Y	3 ()	and the second of the second	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		2.2ng** 0.00	17.5ng**	0.05mg
ARSENIC (PENT)	Y	Y	*850.	*48.	*2,319.	*13.	a series de la companya de la compan		
ARSENIC (TRI)	Y	. Y	360.	190	69.	36.			
ASBESTOS	Y	Υ	E to the least			S. 14 3 3	30K f/L**		
BARIUM	. N	N	f same	هيرا الأمالية	3		1.mg		1.0mg
BENZENE	Y	Υ .	*5,300.	January Service	*5,100.	*700.	0.66ug**	40.ug**	The second second second
BENZIDINE	Y	Y	*2,500.	the second of th	ريفت مو رف		0.12ng	0.53ng**	
BERYLLIUM	Y	. , Y	*130.	*5.3.		na William Rose New York	6.8ng**	117.ng**	
ВНС	. Y	. N .	*100.	77	*0.34				
CADMIUM	Y	N	3.9+	1.1+ w/L	43.	9.3	10.ug		0.010mg
CARBON TETRACHLORIDE	Y	Y	*35,200.		*50,000.		0.4ug**	6.94ug**	
CHLORDANE	Y	Y	2.4	0.0043	0.09	0.004	0.46ng**	0.48ng**	
CHLORIDE	N	N	860 mg/L	230 mg/L	i Željejos je oku izviji		n i kan nye i kansa Maja da salaka da sa	and the second s	te it might become
CHLORINATED BENZENES	Y	Y	*250	*50.	*160.	*129.	488.ug	64	
CHLORINATED NAPHTHALENES	Y	N	*1,600.	4 4 X W 1	*7.5		t very t	1.87.0	
CHLORINE	N	N	19.	. 11.	13.	7.5	t such		1 2 5 2 5
CHLOROALKYL ETHERS	· Y	N	*238,000.	i gradina Roj	erythys i y	9	AF.	A LONG MANTEN	e transper
CHLOROETHYL ETHER (BIS-2)	Y	Y	\$ 5 min 1"	3273		1	0.03ug	1.36ug**	457
CHLOROFORM	Y	Y	*28,900.	*1,240.			0.19ug**	15.7ug**	
CHLOROISOPROPYL ETHER (BIS-2)	Y	N		马上"你说。	S. K.A	H 4755 883	34.7ug	4.36mg	

TABLE 20

Page 2 of 5

WATER QUALITY CRITERIA SUMMARY (Continued)

				tration in Mic Protection of				ation in Units Per tion of Human I	
Compound Name (or Class)	Priority Pollutant	Carcinogen	Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria	Water and Fish Ingestion	Fish Consumption Only	Drinking Water M.C.L.
CHLOROMETHYL ETHER (BIS)	N	Y		the section of the se			0.00000376ng**	0.00184ug**	
CHLOROPHENOL 2	Y	. N .	*4,380.	*2,000.	The state of the s			er er er er er er er er er er er er er e	
CHLOROPHENOL 4	N.	N	200	in the second second second	*29,700.	to a second with	A Comment of the Comm	e de la companya de l	
CHLOROPHENOXY HERBICIDES (2,4,5,-TP)	N	N			e de la companya de l		10.ug	and the same and	
CHLOROPHENOXY HERBICIDES (2,4-D)	N.,	N	i di	Same of March	i de la compania del compania de la compania del compania de la compania de la compania de la compania de la compania de la compania de la compania de la compania del compa	and the second of the second	100.ug	وهدار دراجو والاستادات	
CHLORPYRIFOS	N	N.	0.083	0.041	0.01,1	0.0056	al Arthropia Archenic de Archenic e grand		we then the second of the second
CHLORO-4 METHYL-3 PHENOL	N	N ·	*30.		egeneral region	to A to a second second	and the second	No. 2 partners of the	
CHROMIUM (HEX)	Y 5	N	16.		1,100	50.	50.ug	The State of the Company of the Comp	0.05mg
CHROMIUM (TRI)	N	N	1,700.+	210.+ 9	*10,300		170.mg	3,433.mg	0.05mg
COPPER	. Y	N	18.+	12.+ mls	2.9	2.9	الاستان المستودي من المستودي المستودي المستودي المستودي المستودي المستودي المستودي المستودي المستودي المستودي	regres above to the enterprise of the	
CYANIDE	Y	N -	22.	5.2	1.	1.	200.ug	magnetic for the contract of the street contract	
DDT	. Y	Υ	1.1	0.001	0.13	0.001	0.024ng**	0.024ng**	art at the said
DDT METABOLITE (DDE)	Υ.	Y	*1,050.		.*14.		Antonia i i i i i i i i i i i i i i i i i i	and the first of t	eri i seri e e e e e e e e e e e e e e e e e e
DDT METABOLITE (TDE)	Y	Y	*0.06		*3.6	4	اه الاختراد ما الاهام الاستخواج في وجد الا	The second second	to a second
DEMETON	Y	N ·	1.344.4.124	0.1		0.1	and the second of	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	14 7, 15b
DIBUTYLPHTHALATE	Y	Ν .	1 4 4				35.mg	154.mg	and the second second
DICHLOROBENZENES	Y	N	*1,120.	*763.	*1,970.	e de la campion e qu	400.ug	2.6mg	
DICHLOROBENZIDINE	Y	Y		a e e ques, d			0.01ug**	0.020ug**	to the organization
DICHLOROETHANE 1,2	Y	Y	*118,000.	*20,000.	*113,000.		0.94ug**	243 ug**	we is to the
DICHLOROETHYLENES	Y	Y	*11,600.	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	*224.000.		0.033ug**	1.85ug**	
DICHLOROPHENOL 2,4	, N.	N	*2,020.	*365.	entragnetic entragé	Share to the state of the state of the state of the state of the state of the state of the state of the state of	3.09mg	"我们,在这里的人的"这种第二人,我	Contract of Englishers
DICHLOROPROPANE	Y	N	*23,000.	*5,700.	*10,300.	*3,040.	(***)	77411	
DICHLOROPROPENE	Υ	N	*6,060.	*244.	*790.		87.ug	14.1mg	ja ***
DIELDRIN	Y	Ÿ	2.5	0.0019	0.71	.0019	0.071ng**	0.076ng**	
DIETHYLPHTHALATE	Y	N					350.mg	1.8g	Tank in
DIMETHYL PHENOL 2,4	Y	N :	*2,120.	5 - 19 J. S.			and the same of th		100
DIMETHYL PHTHALATE	Y	N					313.mg	2.9g	
DINITROTOLUENE 2,4	N	Y			**		0.11ug**	9.1ug**	
DINITROTOLUENE	Y	N					70.ug	14.3mg	
DINITROTOLUENE	N	Y	*330.	*230.	* 590.	*370.		1	
DINITRO-O-CRESOL 2,4	Y	N :					13.4g	765.ug	
DIOXIN (2,3,7,8-TCDD)	Y	Y	*0.01	*38 pg/L			0.000013ng**	0.000014ng**	
DIPHENYLHYDRAZINE	Y	N		a e e A caféra d			42.ng**	0.56ug**	

Page 3 of 5

TABLE 20 WATER QUALITY CRITERIA SUMMARY (Continued)

	Priority			tration in Mi r Protection o				tion in Units Per tion of Human I	
Compound Name (or Class)	Pollutant	Carcinogen	Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria	Water and Fish Ingestion	Fish Consumption Only	Drinking Water M.C.L.
DIPHENYLHYDRAZINE 1,2	Y	N	*270.			nan ing sa asar Sila		and a commentation of	
DI-2-ETHYLHEXYL PHTHALATE	Y	N				and the latest	15.mg /500	50.mg	
ENDOSULFAN	Y	N	0.22	0.056	0.034	0.0087	74.ug	159.ug	
ENDRIN	Y	N	0.18	0.0023	0.037	0.0023	l.ug	and the second s	0.0002mg
ÉTHYLBENZENE	Y	N	*32,000.		*430.	an artist of	ارم الله	12 3.28mg	
FLUORANTHENE	Y	N	*3,980.	**	*40.	*16.	42.ug	g 54.ug	of Page 1
GUTHION	N	N	*	0.01		0.01			
HALOETHERS	Y	N	*360.	*122.				7	
HALOMETHANES	Y	Y	*11,000.		*12,000.	*6,400.	0.19ug**	15.7ug**	
HEPTACHLOR	Y	Y	0.52	0.0038	0.053	0.0036	0.28ng**	0.29ng**	
HEXACHLOROETHANE	N	Y	*980.	*540.	*940.		1.9ug	8.74ug	
HEXACHLOROBENZENE	Y	N					0.72ng**	0.74ng**	
HEXACHLOROBUTADIENE	Y	Y	*90.	*9.3	*32.		0.45ug**	50.ug**	
HEXACHLOROCYCLOHEXANE (LINDANE)	Y	Y	2.0	0:08	0.16		, 7.1		0.004mg
HEXACHLOROCYCLOHEXANE-ALPHA	Y	Y					9.2ng**	31.ng**	
HEXACHLOROCYCLOHEXANE-BETA	Y	Y					, 16.3ng**	54.7ng**	
HEXACHLOROCYCLOHEXANE-GAMA	Y	Y			.57		18.6ng**	62.5ng**	
HEXACHLOROCYCLOHEXANE-TECHNI CAL	Y	Y					12.3ng**	41.4ng**	
HEXACHLOROCYCLOPENTADIENE	Y	N	* 7.	*5.2	* 7.		206.ug	***	
IRON	N	N		1,000.			0.3mg 300	o/L	
ISOPHORONE	Y	N	*117,000.		*12,900.	2	5.2mg	520.mg	
LEAD	Y	N	82.+	3.2+	140.	5.6	50.ug		0.05mg
MALATHION	N	N		0.1		0.1			
MANGANESE	N	N		12-			50.ug	100.ug	
MERCURY	Y	N	2.4	0.012	2.1	0.025	144.ng 0,14	146.ng	0.002mg
METHOXYCHLOR	N	Ň	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.03	8 Y .	0.03	100.ug	* * * * * * * * * * * * * * * * * * *	0.1mg
MIREX	N	N		0.001	245	0.001	4 T 4 F 4 T		97a
MONOCHLOROBENZENE	Y	N		35 3	75.7	e e e	488:ug	. 4	3.600
NAPHTHALENE	'Y	N	*2,300.	*620.	*2,350.	100			a and a second a
NICKEL	Y	N	1,400.+	160+	75	8.3	13.4ug	100.ug	190
NITRATES	. N	N					10.mg		10.mg
NITROBENZENE	Υ .	N .	*27,000.		*6,680.	10 /00/2	19.8mg		
NITROPHENOLS	Y	N	*230.	*150.	*4,850.				

TABLE 20

Page 4 of 5

WATER QUALITY CRITERIA SUMMARY (Continued)

	Delority			tration in Mi Protection o				tion in Units Per tion of Human I	
Compound Name (or Class)	Priority Pollutant	Carcinogen	Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria	Water and Fish Ingestion	Fish Consumption Only	Drinking Water M.C.L.
NITROSAMINES	Y	Y	*5,850.		*3,300,000	V 272	0.8ng**	1,240.ng**	11.11
NITROSODIBUTYLAMINE N	Y	Y		****			6.4ng**	587.ng**	
NITROSODIETHYLAMINE N	Y	Y			-		0.8ng**	1,240.ng**	
NITROSODIMETHYLAMINE N	Y	Y					1.4ng**	16,000.ng**	
NITROSODIPHENYLAMINE N	Ý	Y			2.00		4,900.ng**	16,100.ng**	0.794
NITROSOPYRROLIDINE N	Y	Y		1.55/34			16.ng**	91,900.ng**	
PARATHION	N	N	0.065	0.013			0.000081	L).	
PCB's	Y	Y.	2.0	0.014	10.	0.03	0.079ng**	0.079ng**	
PENTACHLORINATED ETHANES	N	N	*7,240.	*1,100.	*390.	*281.	1944	1430,14	
PENTACHLOROBENZENE	N	Ń					74.ug	85.ug	
PENTACHLOROPHENOL	Y	N	***20.	***13.	13.	*7.9	1.01mg		
PHENOL	Y	N	*10,200.	*2,560.	*5,800.		3.5mg		
PHOSPHORUS ELEMENTAL	N	N		,		0.1	ta gazeta a l		
PHTHALATE ESTERS	Ÿ	N	* 940.	*3.	*2,944.	*3.4	435.5	1.00	
POLYNUCLEAR AROMATIC HYDRO- CARBONS	Y	Y	e de la companya de l	en en en en en en en en en en en en en e	*300.		2.8ng**	31.lng**	
SELENIUM	· · · · · Y	N	260.	35.	410.	54.	10.ug		0:01mg
SILVER	· Y · · · ·	Ņ	4.1+	0.12	2.3	and the second of the second	50.ug	a contract of the second second	0.05mg
SULFIDE-HYDROGEN SULFIDE	N	N /	are de liga e	2.5	and the second	2.	the second of the second second of		5.000 C. C. C. C. C.
TETRACHLORINATED ETHANES	····· Y···· ·		*9,320.	professional and a second	e agustes ses		the supplementation of the second	territoria de la compansión de la compan	e has all er can some
TETRACHLOROBENZENE 1,2,4,5	··· Y · · · ·	N	a and a second and a second as	Market Artist		the second of	38.ug	48.ug	A COMPANIES OF
TETRACHLOROETHANE 1,1,2,2	Y	Y		*2,400.	*9,020.	in described.	0.17ug**	10:7ug**	January and American Systems of the Company
TETRACHLOROETHANES	Y	N	*9,320.	200	Erroman er in Sierrom	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	43. 1	1 34 737	
TETRACHLOROETHYLENE	Y	Y	*5,280.	*840.	*10,200.	*450:	0.8ug**	8.85ug**	and a Security Conserva-
TETRACHLOROPHENOL 2,3,5,6	Y	N	established the second	on remain and the		*440.	and the same of	era er i de alamater de de de	
THALLIUM	o se esta y ear are	- 16 Marie 14 Nation - 4650	*1,400.	*40.	*2,130.	to any introduction	13.ug	48.ug	and the state of the state of the
TOLUENE	Y	N	*17,500.	. W. Pykarko	*6,300.	*5,000.	14.3mg 143	2001 424.mg	1911.4
TOXAPHENE	Υ,	Y	0.73	0.0002	0.21	0.0002	0.71ng**	0.73ng**	0.005mg
TRICHLORINATED EHANES	Y	Ÿ	*18,000		and the second second		e grand and a second		
TRICHLOROETHANE 1,1,1	Y	N	in the second	en de la composition della com	*31,2000.	1	18.4mg	1.03g	esta la gar
TRICHLOROETHANE 1,1,2	Y			* 9,400.			0.6ug**	41.8ug**	
TRICHLOROETHYLENE	Y	$\mathbf{Y}_{m,n}$	*45,000.	*21,900.	*2,000.	a. * Ser Sembe	2.7ug**	80.7ug**	l
TRICHLOROPHENOL 2,4,5	N	N	and the second second	3. N. 12 (1) 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			2,600.ug		
TRICHLOROPHENOL 2,4,6	Y	Y		*970.			1.2ug**	3.6ug**	

WATER QUALITY CRITERIA SUMMARY (Continued)

	Dukowitu	·		tration in Mi Protection o				ition in Units Per tion of Human I	
Compound Name (or Class)	Priority Pollutant	Carcinogen	Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria	Water and Fish Ingestion	Fish Consumption Only	Drinking Water M.C.L.
VINYL CHLORIDE	Y	Ý			K., *	8 %	2.ug**	525.ug**	* .
ZINC	Y	N	120.+	110+	95	86	1 1	Say in the	
g = grams	M.C.			F SYMBOLS					

g	=	grams	M.C.L.	= .	Maximum Contaminant Level
mg	=	milligrams	+	=	Hardness Dependent Criteria (100 mg/L used).
ug	=	micrograms	*	=	Insufficient data to develop criteria; value presented is the L.O.E.L. — Lower Observed Effect
ng	=	nanograms			Level.
pg	=	picograms	**	==	Human health criteria for carcinogens reported for three risk levels. Value presented is the
f	=	fibers			10-6 risk level, which means the probability of one concern case per million people at the stated concentration.
Y	=	Yes	4.4.4		
N	=	No	***	=	pH Dependent Criteria (7.8 pH used).

1 = Values in Table 20 are applicable to all basins as follows:

Basin	Rule	Basin	Rule
North Coast	340-41-205(p)	Umatilla	340-41-645(p)
Mid Coast	340-41-245(p)	Walla Walla	340-41-685(p)
Umpqua	340-41-285(p)	Grande Ronde	340-41-725(p)
South Coast	340-41-325(p)	Powder	340-41-765(p)
Rogue	340-41-365(p)	Malheur River	340-41-805(p)
Williamette	340-41-445(p)	Owyhee	340-41-845(p)
Sandy Hood	340-41-485(p) 340-41-525(p)	Malheur Lake	340-41-885(p)
Deschutes	340-41-565(p)	Goose & Summer Lakes	340-41-925(p)
John Day	340-41-605(p)	Klamath	340-41-965(p)

Water and Fish Ingestion

Values represent the maximum ambient water concentration for consumption of both contaminated water and fish or other aquatic organisms.

Fish Ingestion

Values represent the maximum ambient water concentration for consumption of fish or other aquatic organisms.

SA\Table\WH5307.D

Per OAR 340-122-080(5), a screening activity is permitted as part of a remedial investigation at the discretion of the Department. A Level II screening ecological risk assessment attempts to narrow the scope of subsequent site investigation and assessment activities by focusing on those contaminants and media posing potential risks to ecological receptors. Only contaminants that occur at concentrations unsafe for ecological receptors are included as contaminants of potential ecological concern (CPECs). Exposure concentrations that are deemed safe for ecological receptors are herein referred to as "screening benchmark values" (SBVs). This "Level II Screening Benchmark Table" is only for use in screening ecological risk assessments performed in accordance with directions provided in the "Level II Screening" guidance document. These SBVs are generally not appropriate for use as site-specific cleanup levels. This guidance will be updated regularly in response to the addition of new chemicals, discovery of new toxicological data, and changes in regulatory policy.

In general, the exposure concentration that is compared to the SBV depends on the characteristics of the receptor. A concentration should be used that represents a reasonable maximum exposure given the characteristics of the medium and the receptor. A fundamental distinction must be made between receptors that average their exposure over space and time and those that have essentially constant exposure.

- For terrestrial wildlife consuming soil, vegetation, or animal foods, the 90th percentile upper confidence limit (UCL) on the mean is the appropriate media concentration for comparison with the SBV.
- For fish and other aquatic species in flowing waters, the 90th percentile UCL is again the appropriate value for comparison.
- For wildlife that feed on aquatic biota, the 90th percentile UCL is again the appropriate value for comparison.
- For plants and soil invertebrates that are immobile or nearly immobile, the maximum detected concentration is the appropriate value for comparison.

Screening requires specification of individual wildlife species as endpoint species. Thus, identification of candidate assessment endpoints must have taken place before any screening occurs. Screening against "generic" receptors that are not related to assessment endpoints, and which may not actually exist at the site, is not acceptable. In some cases, no appropriate toxicity data are available for a contaminant - receptor combination. In such cases, while toxicity of the contaminant cannot be addressed, neither should the contaminant be eliminated from further consideration. Such contaminants should be retained in a separate category for purposes of determining the need for media toxicity testing (Level IV assessment) and to prevent elimination from further consideration of the media in which it occurs.

These SBVs may not be used to screen contaminant levels in freshwater or marine sediments. Sediments should be evaluated in accord with DEQ's Contaminated Sediment Management Strategy.

SBV - 1

			Soils (mg/kg)		Surface W	ater (mg/L)
	· [Terrestria	Fresh			
Contaminant	CAS No.	Plants	Inverts	Birds	Mammals	Aquatic	Mammals
INORGANICS		• •				e de la companya de l	
Aluminum	7429-90-5	50 c	600 b	1075 e	126 m	0.087"n,t	95 m
Antimony and compounds	7440-36-0	5 c	A 10 10 10 10 10 10 10 10 10 10 10 10 10		8 m	1.6 q	6 m
Arsenic III	7440-38-2	10 c	60 a	126 m	8 m	0.150 t	6 m
Arsenic V						0.150 t	
Barium and compounds	7440-39-3	500 c	3000 b	409 m	252 m	0.004 o	190 m
Beryllium and compounds	7440-41-7	10 c	a and the second		8 e	0.0053 q	6 e
Bismuth		20 d	* ***			and the second of the second	er i i i i i i i i i i i i i i i i i i i
Boron	7440-42-8	0.5 c	20 b	980 m	1130 m	0.0016 o	851 m
Bromine		10 c	10 0 0 0 1	1	the second of the second	1 1 11	2 12 14 14 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18
Cadmium and compounds	7440-43-9	4 c	20 a	196 m	116 m	0.0022 t	88 m
Calcium				e e e e e e e e e e e e e e e e e e e		116 p	
Chromium III		1 c	0.4 a		33000 e	0.074 t	25000 e
Chromium VI	7440-47-3			49 m	30 e	0.011 ñ,q,t	39 e
Cobalt	7440-48-4	20 с	1000 b			0.023 o	* * * * * * * * * * * * * * * * * * *
Copper and compounds	7440-50-8	100 c	50 a	605 m	184 e	0.009 t	138 e
Cyanides	5 2			*	780 e	0.052 q,t	587 e
Fluorine (soluble fluoride)	7782-41-4	200 с	30 Б	314 m	637 m		480 m
Iron		10 d	200 b	and the second		1.000 n,q,t	
Iodine		4 c	en equilibrium s	energita e s	. The second second second second second second second second second second second second second second second	en la la sur la servició de la companya de la companya de la companya de la companya de la companya de la comp	eran our er era
Lanthanum			50 b	8.1	Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Salar Sa		er en en en en en en en en en en en en en
Lead	7439-92-1	50 c	500 a	111 m	514 m	0.0025 t	· 387.m·
Lithium	7439-93-2	2 c	10 b	· · · · · · · · · · · · · · · · · · ·	227 m	0.014 o	171 m
Magnesium						82 p	and the second of the second
Manganese and compounds	7439-96-5	500 c	100 b	9570 e	3400 m	0.120 o	2500 m
Mercuric chloride	7439-97-6			4e	16 e		12 e
Mercury (elemental)	7439-97-6	0.3 с	0.1 a	1 w 1		0.00077 t	e e e e e e e e e e e e e e e e e e e
Mercury (methyl)	22967-92-6	0.0002 d		0.1 e	0.24 e	0.00077 t	0.18 e
Molybdenum	7439-98-7	2 c	200 b	346 m	17 m	0.370 o	13 m
Nickel	7440-02-0	30 c	200 a	1048 m	966 m	0.052 t	728 m
Niobium	a war a fill of a file	an an ing panganan	an are yet trye to been	rando de la partir de la como de	- 10 m	in the moral contract problem is	8 m
Potassium			100	15.74 (2.74)		- 53 p	
Selenium	7782-49-2	1 c `	70 a		4 m	0.005 t	3-m
Silver and compounds	7440-22-4	. 2 C - 2/0	50 b		The Control of the Co	0.00012 q	The Control of the Co
Sodium				<u> </u>		680 p	

Updated July 1999

Oregon Department of Environmental Quality GUIDANCE FOR ECOLOGICAL RISK ASSESSMENT

LEVEL II SCREENING BENCHMARK VALUES

And the second s		eran a sama a sama a			Janes Brand Samuel Services	Surface Water (mg/L)		
	and the second second	وينكي والمالية	Terrestrial	Receptors		Fr	esh -	
Contaminant	CAS No.	Plants	Inverts	Birds	Mammals	Aquatic	Mammals	
Strontium	7440-24-6		Commence of the second	general agreement of the second control of t	- 3100 e	1.500 o	2300 е	
Technetium	I ALLEY TOWN	0.2 с	A CONTRACTOR OF STREET	Commence of the second	The second secon	4 med to the second of the sec	1.00 A 1.	
Tellurium	The state of the s	2 d	and the second	and the second s	The second secon	in the second se	and the fill of the second	
Thallium	e a salah way la	1 c	and the second s	grave transplanta and a grave of the	1 m	0.040 q	1 m	
Tin (inorganic)		50 c	2000 b		Section 1. Section 1.	0.073 o	and the second s	
Titanium	and the second s	· · · · · · · · · · · · · · · · · · ·	1000 b	one of the second of the second	Section of	and the second s	. The many different measurement is a size of the contract of	
Tungsten	per de la compansa de la compansa de la compansa de la compansa de la compansa de la compansa de la compansa d	*	400 b			ه این این ایکیسی این ایم میتاند. های در این ایکیسی	ar inggrane Si inggrane Si inggrane	
Uranium	7440-61-1	5 c	A Cap Transport and Capacity and	157 e	39 m	0.0026 o	30 m	
Vanadium	7440-62-2	2 c		1.12 e	24 m	0.020 o	18 m	
Zinc	7440-66-6	50 c	200 a	1284 m	3800 m	0.120 t	2900 m	
Zirconium			And the second of the second of	a contract to the comments	11 e	0.017 o	9-е	
ORGANICS					The second secon	el a sur a ser la la companion de la companion	and the same of the same of	
Acenaphthene	83-32-9	20 c	e og som er er gren hande minds og. Storte	a was an an an an	in an an in a service of a serv	0.520 q	and the second s	
Acetone	67-64-1	•			121 e	1.500 o	91 e	
Acrolein	107-02-8	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	A Prince To the Control of the Contr	Section Section 1997 to 1997 t	Company of the compan	0.021 q	Contract Action	
Acrylonitrile	107-13-1		1000 b			2.6 q	an e ave -	
Aldrin	309-00-2				l e	0.00006 r	1 e	
Ammonia	7664-41-7		A	90 × × 4 ×	5 3 3 4 4	0.017 p	The second secon	
Aniline	62-53-3	200 d				1 198		
Anthracene	120-12-7	,			And the second of the second of	0.013.0	7.5	
Aroclor 1016	12674-11-2				22 e	an grand the annual region in a	16 e	
Āroclor 1221		3.5	y		en garan araban kalandar kalandar kalandar kalandar kalandar kalandar kalandar kalandar kalandar kalandar kala Araban kalandar kalandar kalandar kalandar kalandar kalandar kalandar kalandar kalandar kalandar kalandar kala	0.00028 o	2 1 mm 2 mm 2 mm	
Aroclor 1232			1,1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Tall the state of the state of	0.00058 o	Marie Committee	
Aroclor 1242				4 e	1 e	0.000053 o	1 e	
Aroclor 1248	4 4 4			e ne care e la la la la la la la la la la la la la	0.2 e	0.000081 o	0.2 e	
Aroclor 1254	11097-69-1		N	2 e	4 e	0.000033 o	3 e	
Aroclor 1260		The second second		1	· · · · · · · · · · · · · · · · · · ·	0.094 o		
Benzene	71-43-2		5 A	er e e e e e e e e	172 e	0.13 o	130 e	
Benzidine	92-87-5		na ing ang ang ang ang ang ang ang ang ang a	And an article services of the	And the second s	0.0039 o	grand and a	
Benzolalanthracene	56-55-3		1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -			0.000027 o	·	
	50-32-8	and the second of the second	n agramma typposees on the entire of English for the entire of	Commencial designation of the Commence of the	7 c.,	0.000014 o	5.e	
Benzoic acid	65-85-0			time week to find the		0.042 o		
Benzyl alcohol	100-51-6			14. J. S. 100 1	1 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m	0.0086 o	SEVERA	
BHC (alpha)	319-84-6			e e santania	The state of the state of the state of	0.0022 o	and the end of the con-	
BHC (beta)	319-85-7				3 e	0.0022.0	2 e	

grundania

SBV - 3

Oregon Department of Environmental Quality GUIDANCE FOR ECOLOGICAL RISK ASSESSMENT

LEVEL II SCREENING BENCHMARK VALUES

			Soils (1	mg/kg)	y 1821	Surface W	ater (mg/L)
• •				Terrestrial Receptors		Fr	esh
Contaminant	CAS No.	Plants	Inverts	Birds	Mammals		Mammals
BHC (gamma) Lindane	58-89-9			20 e	97-e	0.00008 n _i q	73 e
BHC-technical	58-89-9			6 e	0.07 e	e a Sopher	
1,1-Biphenyl	92-52-4	60 c		والمتحدد المكتبر المحاطية	and the second second	0.014 o	San Maria
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7		in the Same	0.91 e	120 e	0.003 o	-90 e
4-Bromoaniline		100 d	and the second Cognition	e de la companya de l	Same a sula a a	Commence of the commence of th	Caranata (Milana)
4-Bromophenyl phenyl ether	101-55-3		Fig. 1. September	the second of the second of	t and the state of	0.0015 o	Energia serviciones e del per l'aggi
2-Butanone		v v	and the greatest men	e. Konstantan kan kan berana berana kendaran berana berana berana berana berana berana berana berana berana beran		14 o	Marie Laboration (1) 100
Butyl benzyl phthalate	85-68-7		والمناج والمساملة الم			0.019 o	gar tar a sida a
Carbon disulfide	75-15-0		The same of the same of	a sa day a sa		0.00092 o	
Carbon tetrachloride	56-23-5		1000 b	graduation and	193 e	0.074 r	146 e
Chlordane	57-74-9		a to a more see	21 e	30 e	0.0000043 q,t	23 е
Chloroacetamide			2 a				
3-Chloraniline	i a di di	20 с	30 a				C
4-Chloroaniline	106-47-8	40 d			,7	. The second	
Chlorobenzene	108-90-7		40 a			0.05 q	
2-Chloroethyl vinyl ether	110-75-8		. as ton .		and the second	4.76 r	
Chloroform	67-66-3		a service and the	s Secondario de la companya de la companya de la companya de la companya de la companya de la companya de la comp	181 e	1,24 q	136 e
beta-Chloronaphthalene	91-58-7		· was ever a very			0.032 r	
2-Chlorophenol	95-57-8	60.d			Logica sa	2.0 q	91, 1
3-Chlorophenol		7 c	10 a	\$ 1	k		
4-Chlorophenol		50.d	e a grad des			tale to allow a	
Chlorpyrifos	2921-88-2		Control of the second	i		0.000041 t	
o-Cresol		50 d			3441 e		2592 e
DDD	72-54-8			0.01 e	2.93 e	0.000001 t	e de la companya del companya de la companya del companya de la co
DDE	72-55-9			0.01 e	2.93 e	1 120	
DDT	50-29-3			0.03 e	10 e	0.000001 q	7 e
Decane						0.049 o	
Demeton	8065-48-3					0.0001 q,t	
Diazinon	333-41-5		32 mg	lo a serie e		0.000043 o	Control of the control
Dibenzofuran	132-64-9			Maria de la companya		0.0037 o	
Di-n-butyl phthalate	84-74-2	200 c	Steen die or von Austr	1.e.	3590 e	0.035 o	2700 e
2,4-Dichloroaniline		714	100 a	1 (1982)	25 25 17 8 V.O.	7.7.4.23.45	Ževenia.
3,4-Dichloroaniline		10 d	20 a	E-18 FORMS			F4 5 37
1,2-Dichlorobenzene	95-50-1			G: 54V		0.014 o	4.1. 19.0 - 19.0011 g. 1
1.3-Dichlorobenzene	541-73-1					0.071 o	1 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1



			Soils (mg/kg)		Surface Wa	iter (mg/L)
in the state of th			Terrestrial		Fresh		
Contaminant	CAS No.	Plants	Inverts	Birds	Mammals	Aquatic	Mammals
1,4-Dichlorobenzene	106-46-7		20 a		To provide the second	0.015 o	Tapetta 1
cis-1,4-Dichloro-2-butene	764-41-0		1000 b	gara a garage		energy and the second	age v
trans-1,4-Dichloro-2-butene			1000 Б	and the same of th		The same of the sa	
1,1-Dichloroethane	75-34-3		,			0.047 o	
1,2-Dichloroethane (EDC)	107-06-2			169 е	340 e	20.0 q	256 e
1,1-Dichloroethylene	75-35-4				838 e	0.025 o	631 e
1,2-Dichloroethylene (cis)	156-59-2		A CONTRACTOR OF THE CONTRACTOR		295.e	0.590 o	222 e
1,2-Dichloroethylene (trans)	156-60-5				295 e	0.590 o	222 e
1,2-Dichloroethylene (mixture)	540-59-0		A CONTRACTOR		295 e	0.590 o	222 e
2,4-Dichlorophenol	120-83-2	20 d	1			3.65 q	
3,4-Dichlorophenol		20 с	20 a				
1,2-Dichloropropane	78-87-5		700 a			5.7 q	
1,3-Dichloropropene	542-75-6	eq.		a carronal car a former conservation	7	0.244 q	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Dieldrin	60-57-1		the second of the second of	1 e	0.2 e	0.000056 t	-0.2 e
Diethyl phthalate	84-66-2	100 c			29000 e	0.210 o	22500 e
Di-n-hexylphthalate					359 e		271 e
2,4-Dimethylphenol	105-67-9	20 с			. I see a series and the series of	0.042 r	
Dimethyl phthalate	131-11-3		200 a		The second of the second	0.003 q	
Dimethyl terephthalate	120-61-6				A	0.003 q	
2,4-Dinitrophenol	51-28-5	. 20 с					
Dinitrotoluene mixture	25321-14-6		a contract			0.230 q	
2,4-Dinitrotoluene	121-14-2					0.230 q	e garante
2,6-Dinitrotoluene	606-20-2		The state of the state of	an a way a Sa	form of the second	0.230 q	A second of the
Di-n-octyl phthalate	117-84-0		, commence of the commence	- 194 - 1940 - 1940	alamana araba	0.708 p	
1,4-Dioxane	123-91-1				6.e		5 е
1,2-Diphenylhydrazine	122-66-7	5.				0.0054 г	
Endosulfan	115-29-7			98 e	2 e	0.000056 q,t	1.e
Endrin	72-20-8			3 e	1 e	0.000036 t	l e
Ethanol				a transmission	385 e	The second second	290 е
Ethyl acetate	141-78-6			* * * * * * * * * * * * * * * * * * *	1087 e	. Programma	818 e
Ethylbenzene	100-41-4	e euro de la creación de la composición	and the control of the man a change	April 18 of the commentary and the second	and the state of t	0.0073 o	Lands of the same seems of the second second
Fluoranthene	206-44-0		(31.4.5)		g y van de	0.00616 n	g Company Company
Fluorene	86-73-7		30 a	Spinister, Fig. 1999		0.0039 p	Parties
Formaldehyde	50-00-0			at all gives	275 e		207 е
Furan	110-00-9	600 c		<u> </u>		The state of the s	

第二十二十分之前。如此十二十分的一次有效的一次可能的可能是可能的。

in the Control of Section 1999

Updated July 1999

			Soils (mg/kg)		Surface W	ater (mg/L)
			Terrestrial		Fr.	esh	
Contaminant	CAS No.	Plants	Inverts	Birds	Mammals	Aquatic	Mammals
1,2,3,6,7,8-Hexa					0.002 e		0:001 e
1,2,3,4,8-Penta					0.6 e		0.4 e
1,2,3,7,8-Penta	·				0.002 e		0.001 e
2,3,4,7,8-Penta					0.0002 e		0.0001 e
2,3,7,8-Tetra	44.1			0.0000008 e			
Guthion	86-50-0					0.00001 t	
Heptachlor	76-44-8	12.4			2 e	0.0000038 q,t	1 e
Heptachlor epoxide	102-45-73			be a company of the		0.0000038 t	and the second s
Heptane		1 d	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	en en en en en en en en en en en en en e	a Sangar and the same of	1000	
Hexachlorobenzene	118-74-1		1000 Ъ	2 - 1944 D. 1944 D.	market and the second second		Name of the second
Hexachlorobutadiene	87-68-3			en in far in	eza en la compania de la compania de la compania de la compania de la compania de la compania de la compania de	0.0093 q	
Hexachlorocyclopentadiene	77-47-4	10 c		Land territoria de la companya de l		0.0052 q	
Hexachloroethane	67-72-1		grading grade en	per meneral meneral	er var extension of	0.540 q	
n-Hexane	110-54-3					0.00058-0	
2-Hexanone				manus e ingeneral property (1998)		0.099 o	
Isophorone	78-59-1			and the same	and the state of t	2.34 r	gar para 1998 Adalah dara sarang
Kepone (Chlordecone)	143-50-0			and the second	- le	man and a second	0.4 e
Malathion	121-75-5			Day to the second of	Anten . tigo	0.0001 q,t	
Methanol	67-56-1		a a suite cure	kaning series and a series	604 e	A CONTRACTOR OF STREET	455 e
Methoxychlor	72-43-5		. I see a see a see a see a see a see a see a see a see a see a see a see a see a see a see a see a see a see a	Andrew Controller of the	48 e	0.00003-g,t	- 36 e
Methylene chloride	75-09-2			games to puts the same	71 e	2.200 o	- 53 e
Methyl ethyl ketone	78-93-3			to the first transfer of	21000 e		16000 e
1-Methylnaphthalene	er Mayor ar			in a supplied to the second	presentation of the contract o	0.0021 o	and the second second
4-Methyl-2-pentanone			,		· · · · · 302 e - ·	0.170 o	227 e
2-Methylphenol	95-48-7		e district	and the state of t	والمراج الأراج الأوالية وسالم	0.013 o	
Mirex	2385-85-5	4 4 4 4			and the second	0.000001 q,t	
Naphthalene	91-20-3	10-d	and the second second		and the second of the second	0.620 q	
Nitrate	14797-55-8			And a second	2325 e	and a marks that a man	
3-Nitroaniline	99-09-2	70 d	and the second second	all the second	and the second second second		and the second
4-Nitroaniline	100-01-6	40 d	18 2 18 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4			
Nitrobenzene	98-95-3	8.d	40 a	je i karaja. Haga	afrikan kacada katalon ay jajah jan sadatta	0.54 r	er en lag dallen bedyggigt t
4-Nitrophenol	100-02-7	10 d	7 a	The second	الماريسية المناسطة ا المناسطة المناسطة ال	0.150 q	
N-Nitrosodi-n-butylamine	924-16-3		A Marine Control of States	and the second s	ولايات والمتعدد	0.117 r	age and age of the second
N-Nitrosodiethanolamine	1116-54-7	the same and the	A COMPLETE OF THE PROPERTY OF	prople to be a server of the s	Karamatan merana dalam sementah dalam	0.117 r	A Section of the sect
N-Nitrosodiethylamine	55-18-5	`				0.117 r	

1. No so (1.2 } - (a) Algorith

			Soils (ma/ka)	te i e i a ^e i i i presenta manga pantan ang i i pendada pangan P	Surface Water (mg/L)		
	1.0			T	and the second s		esh	
Contaminant	CAS No.	Plants	Inverts	Birds	Mammals	Aquatic	Mammals	
N-Nitrosodimethylamine	62-75-9		11 <u>1</u>	ali an and a single single	anta camerinas est a cas astronos e	0.117 r		
N-Nitrosodiphenylamine	86-30-6	and the second	- 20 a	and the second second second	The second of the second of the second	0.210 o	a spage and a second as	
N-Nitroso di-n-propylamine	621-64-7			. d. a. d. a. a. a. a. a. a. a.		0.117 r	a as as as a	
N-Nitroso-N-methylethylamine	10595-95-6		a and a second	A company	Constitution of the second second	- 0.117 r	a production of the control of	
2-Octanone						0.0083 о		
Parathion	56-38-2		A No. of the Control	44		0.000013 q,t		
Pentachlorobenzene	608-93-5		40 a	·	المديد وويناه مدي	0.00047 o		
Pentachloronitrobenzene	82-68-8			5.854 e	and the same of the same	A contract to a		
Pentachlorophenol	87-86-5	- 3 с	- 4·a	- 0.879 e	3 e	0.015 t	2 e	
1-Pentanol			a same			0.110 o	1 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
Phenanthrene						0.0063 n		
Phenol	108-95-2	··· · 70 c· - ···	30 a	a security of the second security	regarding a contract of the garden	0.110 n		
Polychlorinated biphenyls (PCBs)	1336-36-3	- 40 с	e i e i e e e	Commercial Commercial		- 0.000014;q,t		
2-Propanol	4.			San Company		0.0075 o		
Styrene	100-42-5	300 с			man a suither a		. Sylvania	
2,3,7,8-TCDD (dioxin)	1746-01-6			0.0001 e	0.00001 e	*	0.00001 e	
2,3,5,6-Tetrachloroaniline		20 с	20 a			91.0		
1,2,3,4-Tetrachlorobenzene			10 a	Activities of the contract		1 10-		
1,1,1,2-Tetrachloroethane	630-20-6			t e e e e		0.186 r		
1,1,2,2-Tetrachloroethane	79-34-5				9 e	2.4 q	7 е	
Tetrachloroethylene (PCE)	127-18-4	10 d	* * * * * * * * * * * * * * * * * * * *			0.840 q	14.1	
Tetrachloromethane						0.240 o	51.0	
2,3,4,6-Tetrachlorophenol	58-90-2		20 a			. ay tan a a		
Toluene	108-88-3	200 с			170 e	0.0098 o	128 e	
p-Toluidine	106-49-0	··· · 100 d · · · ·	production was a second	X		and delivery of the control of the		
Toxaphene	8001-35-2	and the transfer of		The second second	97-e	0.0000002 q,t	73 e	
Tribromomethane		** .			1 m 1	0.320 о	· - 1 31 ·	
Tributyltin	1 m 1	,			14.00	0.000063 t	. early and the second	
Tributyltin oxide (TBTO)	56-35-9		· · · · · · · · · · · · · · · · · · ·	67 e	153 e	0.01 s	115 e	
2,4,5-Trichloroaniline		20 c	20 a	en y transier in de la company	2000	the second contract the	The second second	
1,2,3-Trichlorobenzene	e de la companya de l		20 a	for a fire or the second	a second design of the second	The state of the second	and the supplied of the state of the same	
1,2,4-Trichlorobenzene	120-82-1		20 a		er in the second of the second	0.110 o		
1,1,1-Trichloroethane	71-55-6		and the state of t	المالية المراجعة الم	6790 e	0.011 o	5114 e	
1,1,2-Trichloroethane	79-00-5	لحاو في شكر الحادات ال	y an gan a taona maga masabal.	and the second of the second o	mangan pan salah man nyana ni ni n	9.4 q	energy of section is a section of the section of	
Trichloroethylene (TCE)	79-01-6				5 e	21.9 g	3 e	

Updated July 1999

Oregon Department of Environmental Quality

GUIDANCE FOR ECOLOGICAL RISK ASSESSMENT LEVEL II SCREENING BENCHMARK VALUES

			Soils (n		Surface Water (mg/L) Fresh		
			Terrestrial				
Contaminant	CAS No.	Plants	Inverts	Birds	Mammals	Aquatic	Mammals
2,4,5-Trichlorophenol	95-95-4	4 c	9 a				
2,4,6-Trichlorophenol	88-06-2	10 d	10 a			0.970 q	
Vinyl acetate	108-05-4					0.016 o	
Vinyl chloride	75-01-4				2 e		2 e
m-Xylene	108-38-3					0.0018 o	
o-Xylene	95-47-6	1 d					
Xylene (mixed)	1330-20-7	100 d			14 e	0.013 o	10 e

NOTES

- a) Oak Ridge National Laboratory (ORNL) TM-126.[1995] Table 1 (earthworms)
- b) ORNL TM-126 [1995] Table 2 (microbial processes)
- c) ORNL TM-85/R3 [1997] Table 1 (soil)
- d) ORNL TM-85/R3 [1997] Table 1 (soil solution)
- e) ORNL TM-86/R3 [1996] Appendix A (Dietary NOAEL calculated from NOAEL dose)
- 1) ORNL TM-95/R4 [1997] Table 3 (secondary chronic value)
- m) ORNL TM-86/R3 [1996] Appendix A (Dietary LOAEL calculated from LOAEL dose)
- n) ORNL TM-96/R2 [1996] Table 1 (NAWQC chronic value)
- o) ORNL TM-96/R2 [1996] Table 1 (Tier II secondary chronic value)
- p) ORNL TM-96/R2 [1996] Table 1 (lowest chronic value, all other organisms)
- q) Oregon Water Quality Criteria [1992] Freshwater chronic criteria (OAR 340-41)
- r) Oregon Water Quality Criteria [1992] Freshwater acute criteria divided by 50 (OAR 340-41)
- s) USEPA [1991] Draft Proposed Ambient Aquatic Life Water Quality Criteria for Tributyltin
- t) USEPA [EPA 822-Z-99-001; April 1999] National Recommended Water Quality Criteria Correction (chronic values)

and of

APPENDIX A Comments to the Draft Report

From: Sent:

Rodney.Struck@deq.state.or.us Monday, October 23, 2000 11:20 AM Craig.Kish@Jacobs.com; john.zimmerman@jacobs.com

To: Subject:

Surface Water/Groundwater Criteria

John & Craig

Included in this email are links to DEQ's Surface Water Standards (Ambient Water Quality Criteria) and DEQ's Ecological Screening levels. These numbers should be used for screening groundwater and surface water data for both UPRR and MFC (in addition to background and RBCs).

Water Quality Standards and Beneficial Uses - Oregon Administrative Rules (OAR) Division 41 - Table 20.

http://waterquality.deg.state.or.us/wg/wgrules/340Div41Tbl20.pdf

Level II Screening Benchmark Values (last updated 7/99). For use in screening ecological risk assessments performed in accordance with directions provided in the final Level II -Screening guidance document

http://www.deq.state.or.us/wmc/cleanup/guidelst.htm

Let me know if you have any questions.

Rod

From: Sent:

Monday, October 23, 2000 11:54 AM Rodney.Struck@deq.state.or.us

To: Subject: Craig Kish@Jacobs.com; john.zimmerman@jacobs.com

an interpolation in a part of the part therefore in the rest. In

TBT and PAHs

Craig and John;

Here is my second installment on the promised information. Please give me a call if you have any questions.

TBT

The Weston report adds several tin species together to derive the total organotin screening value that DEQ used. The following organotin species were added together to derive the organotin screening value the DEQ used.

- tetra-n-butyltin
- tributyl tin
- dibutyl tin
- butyl tin

Note: TBT as a cation should not be included in your calculation of total tributyltin.

PAHs

For the surface soil and sediment samples please calculate the total LPAH and HPAH values for each sample. The following lists were used to derive the Portland Harbor Baseline Values

Low Molecular Weight PAH Acenaphthene Acenaphthylene Fluorene 2-Methylnaphthalene Naphthalene Phenanthrene

High Molecular Weight PAH Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluoranthene Indeno(1,2,3-c,d)pyrene Pyrene²

Rod Struck

Oregon Department of Environmental Quality Northwest Region Voluntary Cleanup and Portland Harbor Section 2020 SW Fourth Avenue, Suite 400 Portland, Oregon 97201

Phone: (503)229-5562 FAX: (503)229-6899

Visit DEQ's web page at : http://www.deq.state.or.us

From: Sent:

To: Subject: Rodney.Struck@deq.state.or.us Monday, October 23, 2000 11:58 AM Craig.Kish@Jacobs.com; john.zimmerman@jacobs.com

Surface Water/Groundwater Criteria

John & Craig

Included in this email are links to DEQ's Surface Water Standards (Ambient Water Quality Criteria) and DEQ's Ecological Screening levels. These numbers should be used for screening groundwater and surface water data for both UPRR and MFC (in addition to background and RBCs).

Water Quality Standards and Beneficial Uses - Oregon Administrative Rules (OAR) Division 41 - Table 20.

http://waterquality.deg.state.or.us/wg/wgrules/340Div41Tbl20.pdf

Level II Screening Benchmark Values (last updated 7/99). For use in screening ecological risk assessments performed in accordance with directions provided in the final Level II -Screening guidance document

http://www.deq.state.or.us/wmc/cleanup/guidelst.htm

Let me know if you have any questions.

Rod

nich din utr

From: Sent:

Rodney.Struck@deq.state.or.us Wednesday, October 25, 2000 9:47 AM Craig.Kish@Jacobs.com john.zimmerman@jacobs.com

ৰ বিজ্ঞান কৰিছে । তেওঁ লগতে নিৰ্দাণ কৰিছে বিজ্ঞান কৰিছে । ভূম পৰিছে বিজ্ঞান

[4] (1877) (1874) (1874) (1874) (1874) (1874)

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To: Cc:

Subject:

MFC Orphan Declaration Date

Craig,

Just remembered I forgot to send you this information. MFC was designated an Orphan site on July 6, 2000. Please insert this date into the introduction on page 1-1.

Thanks.

Rod Struck

Oregon Department of Environmental Quality Northwest Region Voluntary Cleanup and Portland Harbor Section 2020 SW Portland Avenue, Suite 400 Portland, Oregon 97201

Phone: (503)229-5562 FAX: (503)229-6899

Visit DEQ's web page at : http://www.deq.state.or.us

KIBŠKAU JAKSER A

From:

Rodney.Struck@deq.state.or.us

Sent:

Wednesday, October 25, 2000 12:02 PM

To:

Cc

john.zimmerman@jacobs.com Craig.Kish@Jacobs.com; CAMPBELL.Steve.S@deq.state.or.us

Subject: UPRR/MFC Reports

John and Craig:

Just a quick note to follow up our conversation yesterday regarding Section 4 of the MFC and UPRR data reports. The draft report describes hazardous substances that were detected in soil, groundwater, surface water, and sediment samples. The draft report also compares the detected concentrations in soil to USEPA Region IX preliminary remediation goals (PRGs), in groundwater to PRGs or MCLs, and in sediments to Portland Harbor Baseline Values and Dredged Material screening concentrations. In order to make these reports consistent with DEQ requirements and other Portland Harbor sites the following criteria should be used for comparison in the data evaluation:

Soil

EPA Region IX Industrial Soil PRGs

Background Soil Concentrations (metals only) - Washington Department of Ecology - Clark County

Sediment

Portland Harbor Baseline Concentrations

Groundwater/Surface Water

EPA Region IX Tap Water PRGs

Water Quality Standards (Oregon Administrative Rules (OAR)

Division 41 - Table 20).

Level II Screening Benchmark Values (last updated 7/99) (use where Water Quality Standards are not available for PAH constituents)

In addition, the reports should calculate the total LPAH and HPAH concentrations for soil and sediment samples.

In our conversation, you indicated that the comparison to available screening criteria was outside the approved Task Order Scope of Work. However, you stated you believed you should be able to complete the comparisons and finalize the reports within the hours budgeted for the Data Reports. As you track the project costs for the completing the reports, please notify me if additional hours are required.

Thanks.

Rod Struck

Oregon Department of Environmental Quality Northwest Region Voluntary Cleanup and Portland Harbor Section 2020 SW Fourth Avenue, Suite 400 Portland, Oregon 97201

Phone: (503)229-5562 FAX: (503)229-6899

Visit DEQ's web page at : http://www.deq.state.or.us

APPENDIX B Photographs

XPA Investigation Photographs, ODEQ Marine Finance, Portland, Oregon



Location: Marine Finance, location GW-7 on shelf adjacent to rip rap shoreline south of the St. Johns Bridge.

Date/Time: 8/7/00, 1330

Direction of Photograph: southeast.

Description: Staking location at GW-7 in preparation for utility clearance.



Location: Marine Finance, sediment sampling on the Willamette River near location SD-5.

Date/Time: 8/8/00, 1030 Direction of Photograph: NA.

Description: Looking at gelatinous material picked up by van Veen from an area between the Hendren Tow Boat

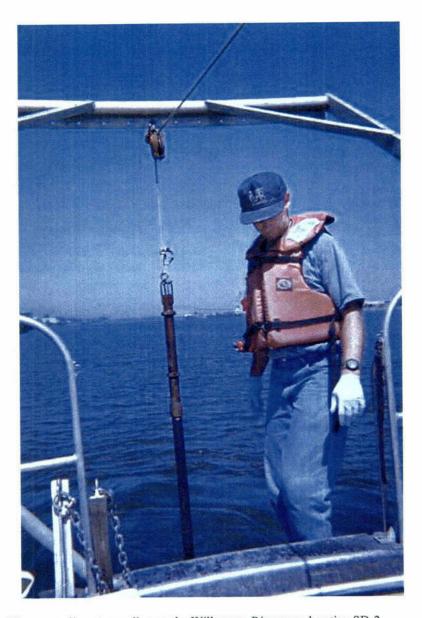
dock and the St. Johns Bridge footer. No other sediment/material was brought up on this attempt.



Location: Marine Finance, sediment sampling on the Willamette River near location SD-5.

Date/Time: 8/8/00, 1040 Direction of Photograph: NA.

Description: Looking at sediment collected at SD-5. Note visible sheen on top of sediment.

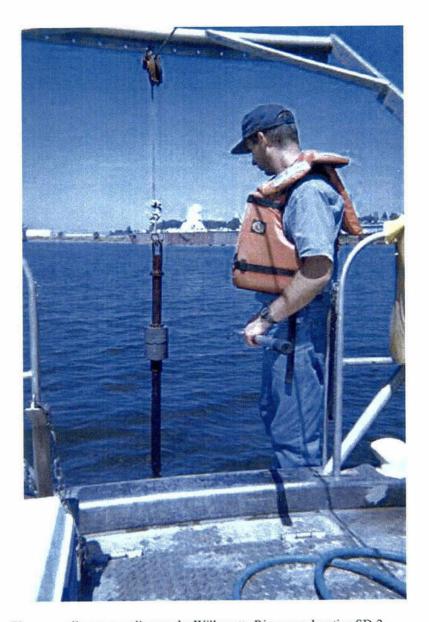


Location: Marine Finance, sediment sampling on the Willamette River near location SD-2.

Date/Time: 8/8/00, 1240

Direction of Photograph: Facing north.

Description: Looking at initial attempts at gravity coring with no additional weights attached to corer.



Location: Marine Finance, sediment sampling on the Willamette River near location SD-2.

Date/Time: 8/8/00, 1330

Direction of Photograph: Facing northeast.

Description: Looking at initial attempts at gravity coring with approximately 100 pounds of lead weights attached to

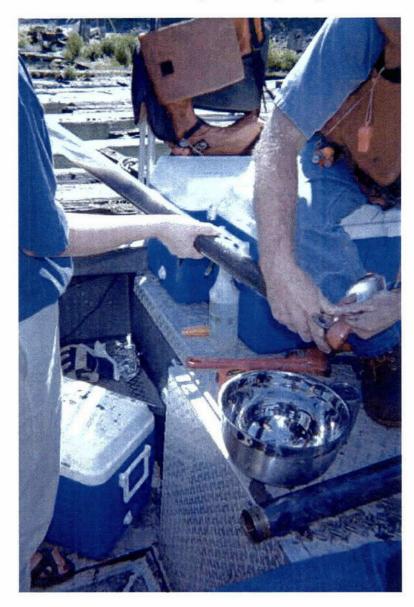
corer.



Location: Marine Finance, sediment sampling on the Willamette River near location SD-5.

Date/Time: 8/8/00, 1530 Direction of Photograph: NA.

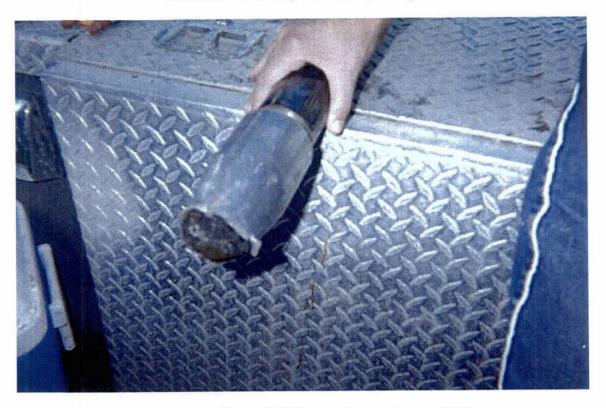
Description: Looking at rusted nut/bolt picked up in gravity corer (no other recovery).



Location: Marine Finance, sediment sampling on the Willamette River near location SD-5.

Date/Time: 8/8/00, 1540 Direction of Photograph: NA.

Description: Showing recovery in liner from SD-5 and transfer to mixing bowl.

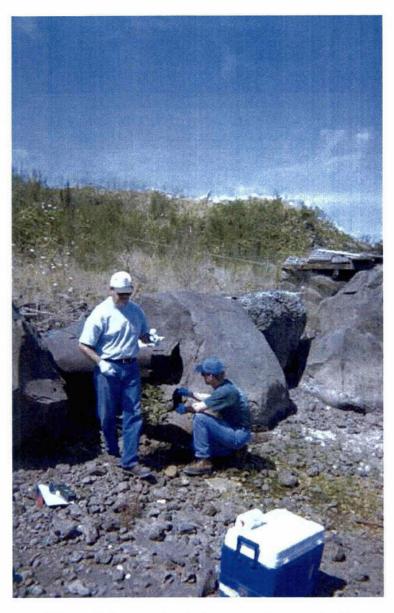


Location: Marine Finance, sediment sampling on the Willamette River near location SD-3.

Date/Time: 8/8/00, 1600 Direction of Photograph: NA.

Description: Showing deformed nosecone and piece of rip rap stuck in nosecone. Had to abandon SD-3 (deep)

because of no recovery. Suspect rip rap and debris preventing penetration below a few inches of sediment.



Location: Marine Finance, SW-2 stand pipe at north end of property adjacent to shoreline.

Date/Time: 8/9/00, 1330

Direction of Photograph: Facing northwest.

Description: Collecting surface water sample SW-2 from the standpipe directly into sample containers. Only a

trickle of water (estimate less than 1 GPM).



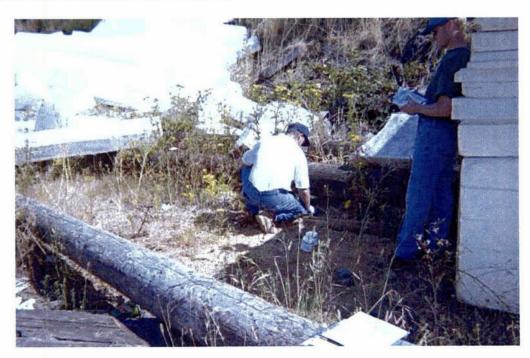
Location: Marine Finance, SW-1/SD-1 seep located at north end of property adjacent to shore.

Date/Time: 8/9/00, 1400

Direction of Photograph: Facing east.

Description: Collecting surface water at SW-1 (seep) before collection of sediment. Noted a rusted steel cable, wood debris, PVC/plastic pieces, aluminum foil, and small electric wire in pool. Also noted water bugs swimming

in the pool. Mark Even Construction in background.



Location: Marine Finance, location SS-7, north end of property, west of the seep and to the southeast of the access

driveway.

Date/Time: 8/9/00, 1500

Direction of Photograph: Facing southeast.

Description: Collecting surface soil at SS-7. Note styrofoam waste staged around area and debris on hillside.



Location: Marine Finance, location SB-5B.

Date/Time: 8/11/00, 0925

Direction of Photograph: Facing north.

Description: Starting DPT advancement at offset location SB-5B. Initial and first offset locations met refusal at 12

feet bgs, so moved location away from river to avoid suspected rip rap/fill.



Location: Marine Finance, location SS-9 adjacent to the Mark Even Construction pier.

Date/Time: 8/10/00, 1010

Direction of Photograph: Facing north/northeast.

Description: Showing location SS-9. Note general debris and waste storage in area. Location SS-9 was to the left

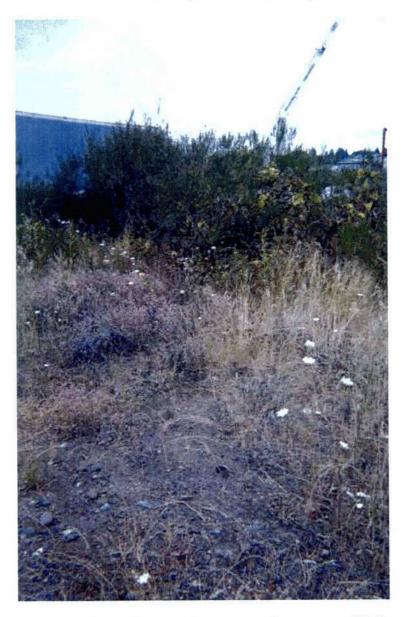
of blue drum.



Location: Marine Finance, location SS-11 under the St. Johns Bridge against the top of the bank.

Date/Time: 8/10/00, 1130 Direction of Photograph: NA.

Description: Showing drum w/ batteries. Drum labeled "Resin" and Flammable Liquid.



Location: Marine Finance, location SS-3 in former steel storage area adjacent to central dock.

Date/Time: 8/10/00, 1340

Direction of Photograph: Facing northeast.

Description: Showing location SS-3 and oil stain with dock in the background (panel truck parked on dock with

crane offloading a barge.



Location: Marine Finance, location SS-5 adjacent to south bay door of the southern Quonset hut.

Date/Time: 8/10/00, 1445

Direction of Photograph: Facing west/northwest.

Description: Showing location SS-5. Note staged material in area (transmission/axle, old Hotsy, miscellaneous

steel).



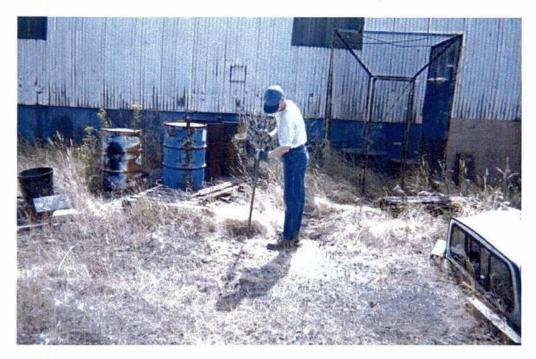
Location: Marine Finance, location SS-6 on east side of the northern Quonset hut.

Date/Time: 8/10/00, 1525

Direction of Photograph: Facing west.

Description: Showing location SS-6 (first composite location). Note stained soil under pallet and miscellaneous

debris in background (ropes, hoses).



Location: Marine Finance, location SS-6 on east side of the northern Quonset hut.

Date/Time: 8/10/00, 1525

Direction of Photograph: Facing west.

Description: Showing location SS-6 (second composite location). Area has welding/grinding metal residue.



Location: Marine Finance, location SS-8 near ODOT staging area.

Date/Time: 8/10/00, 1610

Direction of Photograph: Facing northwest.

Description: Showing location SS-8 south of St. Johns Bridge (background) to the west of the access road west of

the railroad tracks. Note tires, household type garbage, rusted 5-gallon bucket, and scrap metal.



Location: Marine Finance, location SS-1 south of the St. Johns Bridge and north of the gate to Hendren parking.

Date/Time: 8/11/00, 0800

Direction of Photograph: Facing west.

Description: Showing location SS-1 south of St. Johns Bridge in a drum storage area. Part of former building

foundation still in place. Note 4-foot high retaining wall (vegetation covers) in background.



Location: Marine Finance, location SS-2 south of gate to Hendren parking.

Date/Time: 8/11/00, 0910

Direction of Photograph: Facing west.

Description: Showing location SS-2 south of St. Johns Bridge in a drum and debris storage area. Note 4-foot high

retaining wall (vegetation covers) and St. Johns Bridge supports in background.



Location: Marine Finance, location SS-10 at far south end of property adjacent to bank.

Date/Time: 8/11/00, 1325

Direction of Photograph: Facing south.

Description: Showing location SS-10, which was a substituted location at the far south end of the property in an

area of denuded vegetation. Note fence (property line) in background.



Location: Marine Finance, location SB-2/GW-2 at north end of the Hendren parking lot.

Date/Time: 8/11/00, 1300

Direction of Photograph: Facing north/northwest. Description: Showing location SB-2/GW-2.



Location: Marine Finance, location SS-2.

Date/Time: 8/11/00, 1300

Direction of Photograph: Facing southwest. Description: Showing location SS-2.

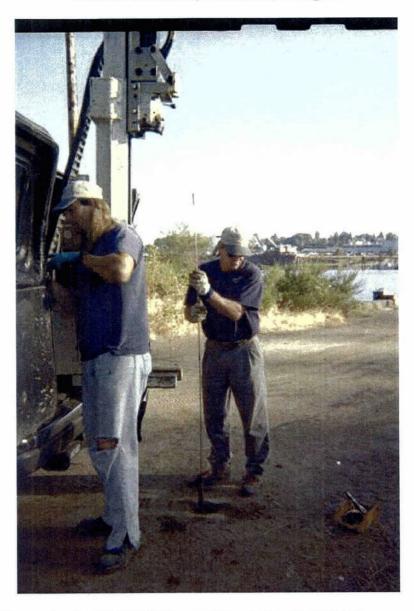


Location: Marine Finance, location GW-5B on southwest corner of central dock.

Date/Time: 8/11/00, 0930

Direction of Photograph: Facing northeast.

Description: Showing groundwater sampling for volatiles (inertia hand-pump) at offset location GW-5B.



Location: Marine Finance, location SB-5B/GW-5B on southwest corner of central dock.

Date/Time: 8/11/00, 0920

Direction of Photograph: Facing east/northeast.

Description: Showing DPT drilling operations at offset location SB-5B (tripping soil sampler).



Location: Marine Finance, location SB-4/GW-4 to east/northeast of the southern Quonset hut.

Date/Time: 8/10/00, 1350

Direction of Photograph: Facing west.

Description: Showing groundwater purge at GW-4.



Location: Marine Finance, location SS-11.

Date/Time: 8/10/00, 1200 Direction of Photograph: NA.

Description: Showing surface soil collection at location SS-11. Note drum and battery to right.



Location: Marine Finance, location SB-5A.

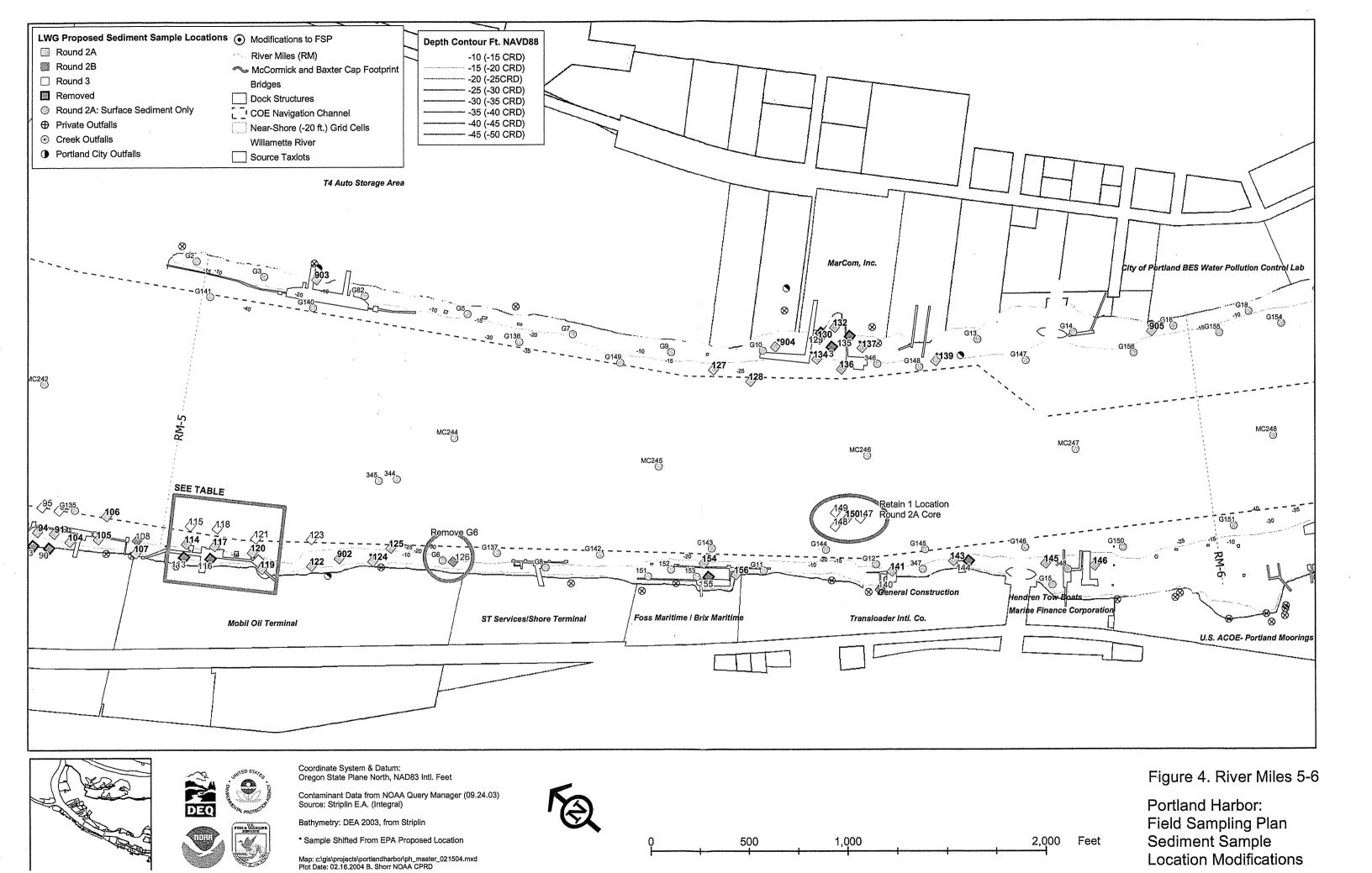
Date/Time: 8/10/00, 1140

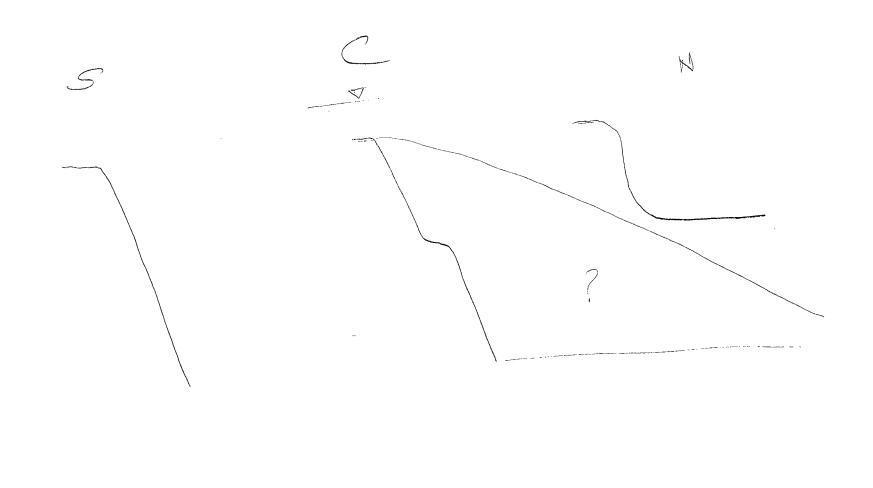
Direction of Photograph: Facing southeast.

Description: Showing PID screening for volatiles in the soil bore at the location SB-5A (first offset location where

refusal was met at 12 feet bgs. Eventually offset a second time on 8/11/00).

APPENDIX C Field Forms





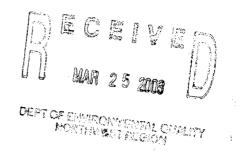
AAC002591

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14945 SW Sequoia Pkwy - Suite 170 | Portland OR 97224 off 503.968.8787 | Fax 503.968.3068

March 24, 2003



Marine Finance Corporation c/o Digital Video Systems 1731 Technology Drive, Suite 810 San Jose, CA 95110

Attention: Mr. Doug Watson

Subsurface Investigation Work Plan - Soil Sampling Groundwater Well Installation and Monitoring Marine Finance Corporation Facility

> 8444 NW St. Helens Road Portland, Oregon GeoDesign Project: MarineFin-1-01

INTRODUCTION

GeoDesign, Inc. is pleased to submit this subsurface investigation work plan, outlining the scope of work to be conducted at the Marine Finance Corporation site. The site is located northwest of the city of Portland, beneath the southwestern end of the St. Johns Bridge, which crosses over the Willamette River (Figure 1). The property is owned by the Marine Finance Corporation who maintains an office trailer at the site. Site tenants include Transversal (Transloader) International Corporation, Hendren Tow Boat Company (Hendren), Blackcat Studios, and Superior Performance. The approximately 9.7-acre site is composed of Tax Lots 100, 500, and 600 located in the northeast quarter of the southeast quarter of Section 11, Township 1N, Range 1W of the Willamette Meridian. The layout of the property is shown on the Site Plan in Figure 2.

BACKGROUND INFORMATION

In September and October 1997, U.S. Environmental Protection Agency's (EPA's) contractor Roy F. Weston collected 187 near-shore sediment samples within the Portland Harbor area, including one sediment sample adjacent to the Marine Finance facility, two upstream samples, and one downstream sample. Contaminants detected in sediments adjacent to the site, near Hendren's dock, at concentrations that exceed the maximum baseline level for the Portland Harbor include copper, lead, mercury, nickel, zinc, 2-methylnaphthalene, carbazole, dibenzofuran, low and high molecular weight polynuclear aromatic hydrocarbons (PAH), and total organic carbon. Citing

concerns regarding Hendren's waste handling practices, the site was added to the Oregon Department of Environmental Quality's (DEQ's) Environmental Cleanup Site Information database in May 1999 (ID #2352). In March 2000, the DEQ inspected the site and identified some hazardous waste storage violations, which were later resolved. DEQ also recommended completion of an Expanded Preliminary Assessment (XPA) and declared the property an Orphan site in July 2000. In August 2000, Jacobs Engineering (Jacobs) completed the XPA under contract with the DEQ.

The XPA included soil and groundwater sampling from 7 direct-push borings, surface soil sampling from 11 locations, surface water sampling from 2 locations, and sediment sampling from 9 locations. The samples were analyzed for one or more of the following suite of analytes: total petroleum hydrocarbons (TPH), PAHs, volatile organic compounds (VOCs), organotins, and 13 priority pollutant metals. Results of the analyses were compared to appropriate risk-based concentrations (RBCs) and other screening levels. In general, detected concentrations exceeded RBCs or other screening criteria as follows: benzo(a)pyrene (a carcinogenic PAH), arsenic, and chromium in surface soils; arsenic in subsurface soil; chloroform, benzo(a)pyrene, chrysene, indeno(1,2,3-cd)pyrene, antimony, arsenic, iron, lead, and manganese in groundwater; barium in surface water; and several PAHs, 2-methylnaphthalene, dibenzofuran, butylbenzylphthalate, arsenic, copper, lead, mercury, and zinc in river sediment. In addition, TPH as diesel and heavy oil was detected in a majority of soil samples. The areas of concern due to contamination identified in the XPA include sediments adjacent to the Hendren dock (PAHs), surface soil next to the Willamette River near the northern site boundary and south of the St. Johns Bridge (PAHs), subsurface soils in the former underground storage tank (UST) area located east of the Marine Finance Corporation office (diesel related), surface soil in the drum storage area near Blackcat Studios (TPH), surface soil on the northern portion of the site near the seep (PAHs), and groundwater next to the shoreline east of the former UST area (metals). Tabulated data from the XPA can be found in Appendix D of Jacobs' Expanded Preliminary Assessment Data Report -Marine Finance Site - Portland, Oregon, dated November 2000.

The DEQ completed a review of Jacobs' XPA data report. In their letter correspondence, dated December 12, 2002, the DEQ concluded that, "in general, the results of the XPA indicate the contamination is not widespread at the site," but, "further work is needed to complete the site characterization." The recommended scope of work to complete the site characterization is presented and discussed in detail in the *DEQ Site Assessment Program ~ Strategy Recommendation*, dated September 30, 2002. It matches the scope of work in their December 12, 2002 letter.

SCOPE OF WORK

The DEQ provided a general scope of work to complete the characterization of the uplands portion of the site. The scope of work does not address river sediments adjacent to the Marine Finance site. The DEQ will refer the site to the EPA to address in-water issues during the proposed harbor-wide remedial investigation. The DEQ scope of work for the upland portion of the site includes the following:



- Soil sampling from at least two discrete depth intervals at locations with the highest contaminant levels in surface soil (SS-2, SS-7, and SS-9) and from the former UST location. (SS-2 was located at the southernmost drum storage area, SS-7 was located near the northern site boundary, and SS-9 was located near the dock next to the former ramp leading to the ferry.)
- Installation and quarterly monitoring (one-year minimum) of approximately six monitoring
 wells across the eastern side of the property to assess shallow groundwater contaminants
 potentially discharging to the Willamette River.
- Collection of additional surface soil samples at approximately 10 locations to better define the lateral extent of surface soil contamination.

DEQ noted, "based on the results of the further investigation, DEQ will determine whether additional actions are necessary to assure protection of human health or the environment."

GeoDesign's scope of work was prepared in accordance with DEQ's general scope of work and addresses the first two bullet items. The type and number of chemical analyses that are proposed are based on the results of the XPA and the DEQ's strategy recommendation. GeoDesign proposes to conduct only essential services during the first phase of work at the site. Those tasks that are deemed less time sensitive and dependent on the results of the first phase of sampling will be saved for a later phase, including surface soil sampling and analysis. The work scope includes only two quarters of groundwater sampling. The need for the third and fourth quarters of groundwater sampling will be evaluated after the first two rounds of groundwater sampling have been completed. Subsequent tasks will be presented in an addendum to this work plan. The four work tasks are described below.

TASK 1: PRE-FIELD ACTIVITIES

GeoDesign will conduct the following pre-field activities preparatory to the investigation.

- Conduct a preliminary site visit to select and mark the boring locations.
- Contact the one-call utility notification center to coordinate the locating of underground utilities beneath the site prior to beginning the subsurface explorations.
- Prepare a site specific Health and Safety Plan as required by hazardous waste operations rules outlined in 29 CFR 1910.120. The Health and Safety Plan Checklist is included in Appendix A.

TASK 2: BORINGS AND MONITORING WELL INSTALLATION

GeoDesign will perform the subsurface investigation, consisting of the following subtasks:

- Subcontract Geo-Tech Explorations, Inc. of Tualatin, Oregon, to advance two Geoprobe® borings to a depth of approximately 20 feet (B-1 and B-2) and six monitoring well borings (MW-1 through MW-6) to a depth of approximately 30 feet.
- Obtain continuous soil samples from the borings for field screening and possible chemical analysis.
- Screen soil samples in the field using visual, water sheen, and headspace vapor screening techniques. Field headspace vapor screening will be conducted using a photoionization detector.



- Based on field screening results, collect soil samples for laboratory analysis from the two 20-foot Geoprobe® soil borings (B-1 and B-2) and two of the 30-foot monitoring well borings (MW-1 and MW-2) at two discrete depth intervals. The soil sample intervals to be submitted for analysis include the groundwater interface and interval showing the strongest indication of contamination based on field screening techniques. Submit the samples to North Creek Analytical (NCA) for laboratory analysis, including diesel-range petroleum hydrocarbons by NWTPH-Dx, PAHs by EPA Method 8270C-SIM, and 13 priority pollutant metals by EPA Method 6010B/7000 series (one sample each). In addition, one sample from B-2 and MW-2 will be submitted for analysis of VOCs analysis by EPA Method 8260B.
- Collect one soil sample from the groundwater interface in each of the remaining four monitoring well borings (MW-3 through MW-6), and submit the samples for laboratory analysis, including PAHs by EPA Method 8270C-SIM and 13 priority pollutant metals by EPA Method 6010B/7000 series. In addition, a soil sample from MW-4 will be analyzed for dieselrange petroleum hydrocarbons by NWTPH-Dx, and a soil sample from MW-6 will be analyzed for VOCs by EPA Method 8260B.
- Observe the installation of six 1.5-inch-diameter groundwater monitoring wells in the 30-foot borings. Each well will have 15 feet of pre-packed screen and will be completed with an aboveground locking monument that is surrounded by three guard posts.
- Backfill the temporary borings with bentonite.
- Develop the six monitoring wells through pumping.
- Coordinate the disposal of soil cuttings, drilling decontamination water, and well purge water.

The two boring and six monitoring well locations are shown on Figure 2. The soil analytical schedule is summarized in Table 1 below.

Table 1
Analytical Schedule Showing Number of Soil Sample Analyses per Boring

Boring No.	NWTPH-Dx	PAHs by 8270C	13 Metals by 6010B/7000 Series	VOCs by 8260B
·B-1	2	2	1	0
B-2	2	2	1	1
MW-1	2	2	1	0
MW-2	2	2	1	1
MW-3	0	1	1	0
MW-4	1	1	1	0
MW-5	0	1	1	0
MW-6	0	1	1	1 .

TASK 3: SURVEY WELLS AND QUARTERLY GROUNDWATER MONITORING

GeoDesign will subcontract a well survey and perform two quarters of groundwater monitoring as follows:



- Subcontract a licensed surveyor to establish the x,y coordinates and top of casing elevations of the six monitoring wells.
- Perform two quarters of groundwater monitoring of the six monitoring wells, e.g. in April and July.
- Once each quarter, measure depth to water in each of the wells to the nearest 0.01 foot using a water level indicator.
- Once each quarter, purge at least three casing volumes of groundwater using a peristaltic pump. Monitor pH, conductivity, and temperature.
- Once each quarter, collect a representative groundwater sample from each of the six wells using a new length of sample tubing fitted with a ball-foot check valve. Transfer the samples to laboratory prepared sample containers. Submit samples under chain or custody procedures to NCA for analysis of VOCs (MW-2 and MW-6) by EPA Method 8260B, PAHs (all wells) by EPA Method 8270C, and 13 total priority pollutant metals (all wells) by EPA Method 6010B/7000 series. A total of 8 groundwater samples will be analyzed each quarter, including 2 quality assurance/quality control (QA/QC) samples. The total number of samples to be obtained for each of the two quarters is 16.

The six monitoring well locations are shown on Figure 2. The groundwater analytical schedule is summarized in Table 2below.

Table 2
Analytical Schedule Showing Number
of Groundwater Sample Analyses per Well (Two Quarters)

Boring No.	PAHs by 8270C	13 Metals (totals)	VOCs by 8260B
MW-1	2	2	0
MW-2	2	2	2
MW-3	2	2	0
MW-4	2	2	0
MW-5	2	2	0
MW-6	2	2	2
QA/QC Sample	4	4	2

The need for two additional quarters of groundwater monitoring will be determined in consultation with DEQ based on the results of the first two rounds of groundwater sample analysis.

TASK 4: REPORTING

GeoDesign will report the results of subsurface investigation and two quarterly groundwater monitoring events.

• The report of the investigation will include a description of the methods used, summary of subsurface conditions encountered, and evaluation of the analytical data. Soil boring logs, well as-built diagrams, a site plan showing boring/well locations, analytical reports, and chain of custody documents will be included.



- The results of the first groundwater monitoring event will be reported along with the results
 of the drilling investigation. Subsequent monitoring events will be reported separately. Each
 report will include a summary of methods, conditions encountered, and an analysis of the
 data. A groundwater contour map, field report, analytical report, and chain of custody
 documents also will be included.
- Present the results of the investigation and first groundwater monitoring event to Marine Finance and later the DEO following a client review.

ADDITIONAL TASKS

GeoDesign proposes to conduct surface soil sampling during a subsequent phase to assist with soil management decisions when developing the site. Surface soil samples will be collected at approximately 10 locations using a hand auger, and the samples will be submitted for laboratory analysis. The specific scope of work for surface soil sampling and analysis will be presented at a later date in a work plan addendum. The scope of work for conducting additional rounds of groundwater monitoring, if necessary, also will be presented in the work plan addendum.

SCHEDULE

Drilling and well installation activities are scheduled for March 21, 2003 and March 24, 2003. The wells will be developed following the well installation. Within about one week of the well development, the six wells will be purged and sampled. The wells also will be surveyed. The groundwater samples will be submitted for laboratory analysis. Sample turn-around is approximately 10 working days. Approximately three weeks following receipt of the laboratory analytical results, GeoDesign will submit the draft subsurface investigation and first quarter groundwater monitoring report to Marine Finance. The report will be submitted to the DEQ following the client review.

+ + +



We appreciate the opportunity to submit this subsurface investigation work plan. Please call if you have any questions regarding this submittal.

Sincerely,

GeoDesign, Inc.

Paul M. Trone, R.G. Senior Geologist

Robert E. Belding. R

Principal

cc: Mr. Mark Pugh, Oregon Department of Environmental Quality, Northwest Region Mr. Gordon Carey, Gordon Carey Associates

REB:kt

Attachments

One copy submitted

Document ID: MarineFin-1-01-032403-envwp-ri.doc

HEALTH AND SAFETY PLAN CHECKLIST ENVIRONMENTAL SERVICES MarinFin-1-01

I. GENERAL PROJECT INFORMATION

Project Name: Soil and Groundwater Investigation

Project Number: MarineFin-1-01
Type of Project: Site Characterization

Start/Completion Dates: March 21, 2003 through July 30, 2003

Subcontractors: Geo-Tech Explorations, North Creek Analytical, Inc., CSA Consulting

Engineers, and Waste Express

II. PERSONNEL/CONTACT INFORMATION PHONE NUMBERS

Site Safety Officer: Steve Nelson Project Manager: Paul Trone

Health and Safety Program Manager: Paul Trone

Field Engineer/Geologist: Steve Nelson Client: Marine Finance Corporation

III. LIST OF FIELD ACTIVITIES

Check	the	activities	applicable	to	project
CIICCK	UIL	activities	applicable	w	PIOICE

__X_ Exploratory borings
____ Vapor well installation

__X_ Surveying

X Ground water depth and/or free product measurement

Recovery of free product

__X_ Monitor well development __X_ Groundwater sampling

____ Vapor measurements

Remediation system monitoringTest pit exploration

____ Underground storage tank removal monitoring

____ Remedial excavation

__X_ Soil testing

 \underline{X} Field screening of soil samples

____ Site reconnaissance

IV. SITE DESCRIPTION -- Attach map

Location/Size: 8444 NW St. Helens Road, Portland, Oregon

Topography: Flat

Current Owner: Marine Finance Corporation

Site Security: none

Road access: yes, via St. Helens Road (Highway 30)

Water access: yes

Electrical access: yes

Utility check complete: Utility Notification Center contacted on March 18, 2003.

Information applicable to site: Two 20-foot soil borings will be completed at the site to evaluate the vertical extent of petroleum hydrocarbon and metals contamination. Six 30-foot groundwater monitoring wells will be installed on the shoreline adjacent to the Willamette River to evaluate potential impacts along the groundwater to surface water pathway. Water levels will be measures in all site monitoring wells, and the wells will be purged and sampled on a quarterly basis.

History of the site: The property is owned by the Marine Finance Corporation who maintains an office trailer at the site. Site tenants include Transversal (Transloader) International Corporation International Corporation, Hendren Tow Boat Company (Hendren), Blackcat Studios, and Superior Performance. Over concerns regarding Hendren's waste handling practices, the site was added to the Oregon Department of Environmental Quality's (DEQ's) Environmental Cleanup Site Information database in May 1999 (ID #2352). In March 2000, the DEQ inspected the site and identified some hazardous waste storage violations, which were later resolved. During the meantime, the DEQ recommended an Expanded Preliminary Assessment (XPA) and declared the property an Orphan site in July 2000. In August 2000, Jacobs Engineering (Jacobs) completed the XPA under contract with the DEQ.

V. EMERGENCY INFORMATION

Hospital Name: Good Samaritan Hospital, 1015 NW 22nd Avenue

Directions to Hospital: Go southeast on NW St. Helens Rd. Turn right on NW Ward Way. NW Ward Way becomes NW Vaughn Street. Turn right onto NW 23rd Avenue. Turn left onto NW Northrup Street. Turn right onto NW 22nd Avenue. McAndrews Road. Turn Right on Crater Lake Avenue.

Phone Numbers: Hospital: 503-229-7711

Ambulance: 911; Police: 911; Fire: 911

Poison Control: 1-800-222-1222

Location of Nearest Telephone: Bring mobile phone

Nearest Fire Extinguisher: In drill rig. Nearest First Aid Kit: In car/ in drill rig.

VI. HAZARDS/PRECAUTIONS

- 1. Free product at site? Not expected.
- 2. Substances known to occur at site are: total petroleum hydrocarbons (TPH), PAHs, metals, limited volatile organic compounds (VOCs).
- 3. Known chemical characteristics: Carcinogenic

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X_	Drill rig
	Backhoe
	Excavations/trenching
	Shored/braced excavation if greater than 4 feet of depth
	Overhead hazards/powerlines



	Debris on site (tripping/puncture hazards)
	Unusual traffic hazard
	X_ Other expected physical hazards: uneven ground and steep terrain
5.	Other potential hazards on site:
	Heat stress potential? no
	Cold exposure? no
	Confined space entry? no
	Asbestos-containing materials? no

Based on previous site investigations, detected concentrations of potential contaminants that exceeded RBCs or other screening criteria are as follows: benzo(a)pyrene (a carcinogenic PAH), arsenic, and chromium in surface soils; arsenic in subsurface soil; chloroform, benzo(a)pyrene, chrysene, indeno(1,2,3-cd)pyrene, antimony, arsenic, iron, lead, and manganese in groundwater; barium in surface water; and several PAHs, 2-methylnaphthalene, dibenzofuran, butylbenzylphthalate, arsenic, copper, lead, mercury, and zinc in river sediment. In addition, TPH as diesel and heavy oil was detected in a majority of soil samples.

The potential exposure pathways for these Contaminants of Concern (COCs) for the project are: (1) inhalation/ingestion of contaminated airborne particles and vapors, (2) ingestion of contaminated media, and (3) dermal and/or eye contact with contaminated media or equipment. To mitigate potential exposure to these COCs, site workers will wear personal protective equipment and equipment will be decontaminated.

In addition to chemical hazards at the site, certain physical hazards are associated with the site investigation. The physical hazards include working around drill rigs and other heavy equipment during explorations.

VII.	PERS	UNAL PROTECTIVE EQUIPMENT
	Check	capplicable level of protection to be used initially:
	X	Level D
		Level C
		Modifications (specify):

VIII. AIR MONITORING PLAN

Check instrumentation to be used:

___ Photovac TIP

X Minirae PID

Landtec GEM500 gas extraction monitor

IX. DECONTAMINATION PROCEDURES

Minimal decontamination consists of washing soiled boots and gloves; discarding protective clothing prior to leaving the site. Down-hole drill rig equipment must be decontaminated between borings. Investigative-derived waste will be temporarily stored in 55-gallon drums pending receipt of laboratory results.



X.	X_ On-site, pending Other (describe d	ORAGE (Drill cuttings, pur analysis and further action estination, responsible part cted to be generated.	
XI.	Required forms:	CTED TO BE COMPLETED: acknowledgement by emplo	
	Conditional forms:	Accident Report Heat stress Exposure report	
XII.	orientation. Thereafter, b Safety Officer. The orient	g in this project must receiv orief tailgate safety meeting	s as deemed necessary by the site y meetings shall include a discussio
XIII.	APPROVALS		
	1. Plan Prepared	Signature	Date
	2. Plan Approval	P.M. Signature	 Date
		HSPM Signature	
		GeoDesign Safety Officer Signature	



FORM 2 - SITE SAFETY PLAN - ACKNOWLEDGEMENT

(All site workers complete this form and return to Steve Nelson)

Project Number: MarineFin-1-01

Project Description/Name: Soil Sampling and Groundwater Well Installation and Monitoring

Client: Marine Finance Corporation

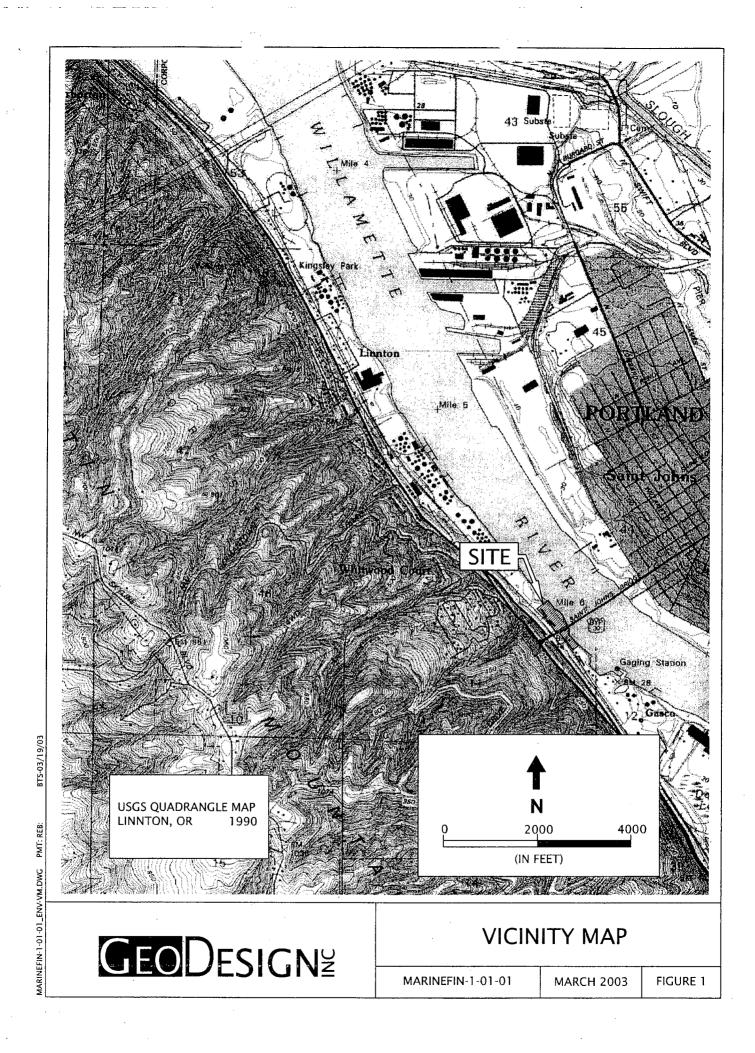
KNOWN (OR ANTICIPATED) HAZARDOUS SUBSTANCES

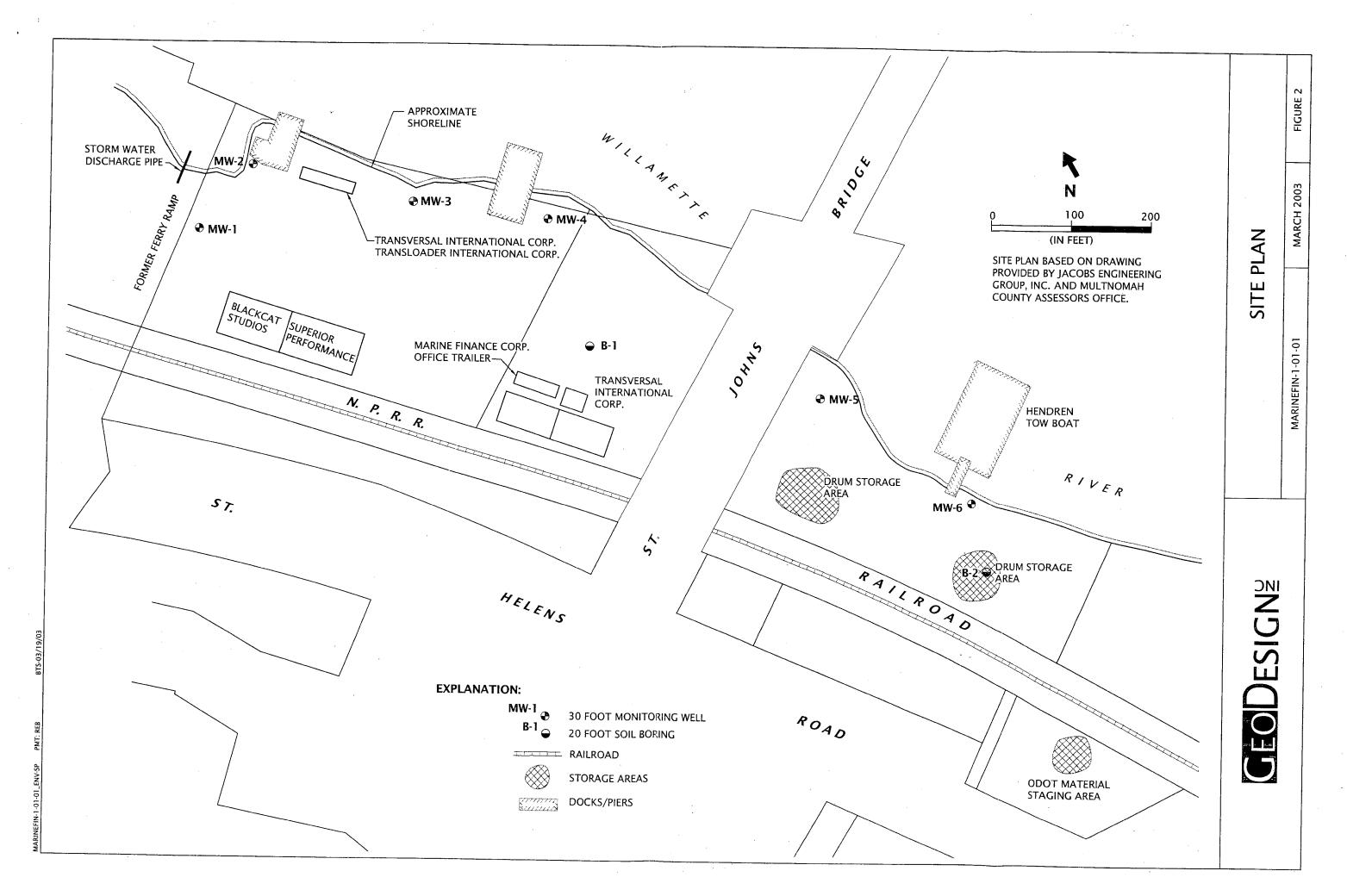
TPH, PAHs, metals, and selected VOCs

I do hereby verify that a copy of the current Safety Plan has been provided by GeoDesign, Inc. for my review and personal use. I have read the document completely and acknowledge a full understanding of the safety procedures and protocol for my responsibilities on site. I agree to comply with all required, specified safety regulations and procedures. I understand that I will be informed immediately of any changes that would affect site personnel safety.

SIGNED	Date:
SIGNED	Date:
SIGNED	Date:







GEO DESIGNE

PHASE II ENVIRONMENTAL SITE ASSESSMENT

Marine Finance Corporation

8444 NW St. Helens Road Portland, Oregon

For Marine Finance Corporation c/o Digital Video Systems June 16, 2003

GeoDesign Project: MarineFin-1-01-05



DEEL OR EVENUE MENDRALLON OR LABOR

Engineers | Geologists | Environmental Consultants



14945 SW Sequoia Pkwy - Suite 170 | Portland OR 97224 off 503.968.8787 | Fax 503.968.3068

June 16, 2003

Marine Finance Corporation c/o Digital Video Systems 1731 Technology Drive, Suite 810 San Jose, CA 95110

Attention: Mr. Doug Watson

Phase II Environmental Site Assessment

Marine Finance Corporation Facility 8444 NW St. Helens Road Portland, Oregon

GeoDesign Project: MarineFin-1-01-05

GeoDesign, Inc. is pleased to submit our Phase II Environmental Site Assessment for the Marine Finance Corporation Facility located at 8444 NW St. Helens Road in Portland, Oregon. Contractual terms for our services are contained in our proposal dated February 20, 2003.

We appreciate the opportunity to be of service to you. Please contact us if you have questions regarding this report.

Sincerely,

GeoDesign, Inc.

Robert E. Belding, R.G.

Principal Geologist

cc: Mr. Gordon Carey

Mr. Mark Pugh, Oregon Department of Environmental Quality

SGR:PMT:REB:kt

Attachments

One copy submitted

Document ID: Phase II 060603.envr.doc

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1.0 INTRODUCTION

This report summarizes the results of our Phase II Environmental Site Assessment (ESA) for the property located at 8444 NW St. Helens Road in Portland, Oregon. The approximate 9.7-acre property is composed of the land immediately surrounding the western side of St. Johns Bridge on the Willamette River. The Phase II ESA consisted of a subsurface investigation; soil sampling; groundwater well installation; and monitoring for diesel hydrocarbons, volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and 13 priority pollutant total metals. This Phase II ESA was conducted to address environmental concerns identified during exploratory sampling activities that resulted in an Expanded Preliminary Assessment (XPA), performed by Jacobs Engineering in November 2000, for the subject property. The scope of work was conducted in accordance with our proposal dated February 20, 2003. The site and surrounding physical features are shown in Figure 1. The site layout and locations of soil borings and monitoring wells on the site are shown in Figure 2.

2.0 BACKGROUND

In fall of 1997 the U.S Environmental Protection Agency (EPA) contracted Weston for the collection of 187 near-shore sediment samples along the Portland Harbor Area. Three sediment samples were collected adjacent to the site. This exploratory sampling project identified contaminated sediments in two of the samples adjacent to the site. Contaminant concentrations exceeding either the Oregon Department of Environmental Quality (DEQ) Ecological Risk Assessment Screening Level Value (SLV) or Portland Harbor Baseline Value included arsenic, cadmium, copper, lead, manganese, mercury, nickel, zinc, 2-methylnaphthalene, 4-methylphenol, benzoic acid, benzyl alcohol, butylbenzylphthalate, carbazole, di-N-butylphthlate, di-N-octylphthalate, dibenzofuran, dimethylphthalate, pentachlorophenol, phenol, PAHs, and polychlorinated biphenyls.

Following the EPA sampling event, the DEQ contracted Jacobs Engineering (Jacobs) to perform an XPA for the subject area in order to further analyze the extent of contamination around the western side of St. Johns Bridge. Jacobs collected 7 samples from direct-push borings, 11 surface soil samples, 9 sediment samples, and 2 surface water samples (See Appendix C for sample locations and results). Laboratory analyses for groundwater reported concentrations above EPA Region 9 Preliminary Remediation Goals (PRGs) for chloroform, benzo(a)pyrene, chrysene, indeno(1,2,3-cd)pyrene, antimony, arsenic, iron, lead, and manganese. Laboratory analyses for surface water reported concentrations of barium above the PRG. Laboratory analysis of surface soil samples (6-inch depth) reported concentrations above the PRG for benzo(a)pyrene, arsenic, and chromium. Laboratory analysis of subsurface soil samples reported concentrations of arsenic above the PRG. Laboratory analysis of sediment samples reported concentrations above SLVs or Portland Harbor Baseline Values for PAHs, 2-methylnaphthalene, dibenzofuran, butylbenzylphthalate, arsenic, copper, lead, mercury, and zinc.

DEQ prepared a Site Assessment Program-Strategy Recommendation Letter (December 12, 2002) in response to the XPA provided by Jacobs. The letter described specific data gaps to be addressed on the project site. GeoDesign has addressed these data gaps for the upland portion of the site in the scope of work completed for this Phase II ESA.



3.0 SCOPE OF WORK

The DEQ's December 12, 2002 letter provided a general scope of work to complete the characterization of the uplands portion of the site. The scope of work does not address river sediments adjacent to the Marine Finance site. We understand that the DEQ will refer the site to the EPA to address in-water issues during the proposed harbor-wide remedial investigation. The DEQ scope of work for the upland portion of the site includes the following:

- Soil sampling from at least two discrete depth intervals at locations with the highest contaminant levels in surface soil as determined by environmental sampling conducted by Jacobs (SS-2, SS-7, and SS-9) and from the former underground storage tank (UST) location (Figure 2).
- Installation and quarterly monitoring (one-year minimum) of approximately six monitoring
 wells across the eastern side of the property to assess shallow groundwater contaminants
 potentially discharging to the Willamette River, as well as flow direction and gradient.
- Collection of additional surface soil samples at approximately 10 locations to better define the lateral extent of surface soil contamination (not addressed in this study).

DEQ noted, "based on the results of the further investigation, DEQ will determine whether additional actions are necessary to assure protection of human health or the environment."

GeoDesign's completed scope of work addressed DEQ's first two bullet items noted above. The type and number of chemical analyses that were conducted are based on the results of the XPA and the DEQ's strategy recommendation. Those tasks that are deemed less time sensitive and dependent on the results of the first phase of sampling will be saved for a later phase, including surface soil sampling and analysis. The work scope includes only two quarters of groundwater sampling events, the first of which is presented in this report. The need for two additional rounds of groundwater sampling will be evaluated after the first two rounds of groundwater sampling have been completed. The five work tasks completed during the current study are described below. Further detail regarding the following tasks can be reviewed in GeoDesign's Work Plan, dated March 24, 2003.

TASK 1: DATA EVALUATION AND WORK PLAN PREPARATION

GeoDesign developed a subsurface investigation work plan based on the results of the XPA and DEQ's strategy recommendation. The work plan included soil and groundwater sampling rationale, a table of proposed chemical analyses, and a map of proposed boring/well locations. The work plan, dated March 24, 2003, was submitted to DEQ for final approval prior to conducting the investigation.

TASK 2: PRE-FIELD ACTIVITIES

GeoDesign conducted the following pre-field activities preparatory to the investigation.



- Conduct a preliminary site visit to select and mark the boring locations.
- Contact the one-call utility notification center to coordinate the locating of underground utilities beneath the site prior to beginning the subsurface explorations.
- Prepare a site-specific Health and Safety Plan checklist as required by hazardous waste operations rules outlined in 29 CFR 1910.120.

TASK 3: BORINGS AND MONITORING WELL INSTALLATION

GeoDesign performed a subsurface investigation, consisting of the following subtasks:

- Subcontract Geo-Tech Explorations of Tualatin, Oregon, to advance two Geoprobe® borings to depths of 9 and 20 feet below the ground surface (bgs), respectively, and six monitoring well borings to a depth of approximately 30 feet bgs.
- Obtain continuous soil samples from the borings for field screening and possible chemical analysis.
- Screen soil samples in the field using visual, water sheen, and headspace vapor screening techniques.
- Based on field screening results, collect soil samples for laboratory analysis from the 20- and 9-foot Geoprobe® soil borings (drilled near SS-2 and SB-4) and two of the 30-foot monitoring well borings (drilled near SS-7/SW-2 and SS-9/SW-1) at two discrete depth intervals. Submit the samples to North Creek Analytical (NCA) of Beaverton, Oregon, for laboratory analysis, including diesel-range petroleum hydrocarbons by NWTPH-Dx (8), VOCs by EPA Method 8260B (2), PAHs by EPA Method 8270C-SIM (8), and 13 priority pollutant metals by EPA Method 6010B/7000 series (4).
- Collect one soil sample from the groundwater interface in each of the remaining four monitoring well borings (drilled near SS-10/GW-6, GW-5, SS-11/GW-7, and GW-2) and submit the samples for laboratory analysis, including PAHs by EPA Method 8270C-SIM (4), VOCs by EPA Method 8260B (1), and 13 priority pollutant metals by EPA Method 6010B/7000 series (4).
- Observe the installation of six 1.5-inch-diameter groundwater monitoring wells in the 30-foot borings. Complete each well with 15 feet of pre-packed screen with either a flushmount, traffic rated monument or an aboveground locking monument surrounded by guard posts.
- Backfill the temporary borings with bentonite, and repair the surface to match existing grade.
- Develop the six monitoring wells through pumping.
- Coordinate the disposal of soil cuttings, drilling decontamination water, and well purge water.

TASK 4: SURVEY WELLS AND QUARTERLY GROUNDWATER MONITORING

Subcontract a well survey and perform two quarters of groundwater monitoring as follows:

- Subcontract a licensed surveyor to establish the x, y coordinates and top of casing elevations of the six monitoring wells.
- Perform two rounds of groundwater monitoring of the six monitoring wells, e.g. in March and June 2003 (on a quarterly schedule) or March and September 2003 (on a semi-annual schedule).



- Once each event, measure depth to water in each of the wells to the nearest 0.01 foot using a water level indicator.
- Once each event, purge at least three casing volumes of groundwater using a peristaltic pump. Monitor pH, conductivity, and temperature.
- Once each event, collect a representative groundwater sample from each of the six wells using a new length of sample tubing fitted with a ball foot check valve. Transfer the samples to laboratory prepared sample containers. Submit samples under chain or custody procedures to NCA for analysis of VOCs by EPA Method 8260B (2), PAHs by EPA Method 8270C (6), and 13 priority pollutant metals (totals) by EPA Method 6010B/7000 series (6). A total of 8 groundwater samples would be analyzed each quarter, including 2 quality assurance/quality control samples. The total number of samples for the two quarters is 16.

The need for two additional quarters of groundwater monitoring will be determined in consultation with DEQ based on the results of the first two rounds of groundwater sample analysis.

TASK 5: REPORTS AND MEETING

Reports will be prepared summarizing the results of subsurface investigation as well as two quarterly groundwater monitoring events.

- The report of the investigation would include a description of the methods used, summary of subsurface conditions encountered, and evaluation of the analytical data. Soil boring logs, well as-built diagrams, a site plan showing boring/well locations, analytical reports, and chain of custody documents will be included.
- The results of the first groundwater monitoring event would be reported along with the
 results of the drilling investigation. Subsequent monitoring events would be reported
 separately. Each report would include a summary of methods, conditions encountered, and
 an analysis of the data. A groundwater contour map, field report, analytical report, and chain
 of custody documents also would be included.
- Present the results of the investigation and first groundwater monitoring event to the client during a meeting.

ADDITIONAL TASKS

GeoDesign proposes to conduct surface soil sampling during a subsequent phase to assist with soil management decisions when developing the site. Surface soil samples would be collected at approximately 10 locations using a hand auger, and the samples would be submitted for laboratory analysis. The specific scope of work and costs for surface soil sampling and analysis would be presented at a later date under separate cover.

4.0 SITE DESCRIPTION AND PHYSICAL SETTING

The subject property is located northwest of the city of Portland, beneath the southwestern end of the St Johns Bridge, on the western side of the Willamette River. The approximately 9.7-acre site is composed of Tax Lots 100, 500, and 600 in the southeast quarter of Section 11, Township



1N, Range 1W of the Willamette Meridian. The site is occupied by multiple tenants, including Transversal (Transloader) International Corporation, Hendren Tow Boat Company, Blackcat Studios, and Superior Performance (Figure 2).

5.0 SITE GEOLOGY AND HYDROGEOLOGY

The Marine Finance site is located on the western bank of the Willamette River with surface topography sloping gently toward the waterfront. General surficial site geology consists of fill material, native Willamette River terrace deposits, and native Willamette River Basin alluvium. Records of fill suggest that the material was brought to the site in two or more stages, and the fill was most likely obtained from private dredging operations. The native soil deposits are Pleistocene Age and consist of stratified sands and silt. The terrace deposits tend to be nearly indistinguishable from the alluvium. However, the terrace deposits are known to be approximately 10 feet in thickness while the alluvium can be up to 100 feet thick (Trimble, 1957). Underlying the surficial sediments and fill are Columbia River Basalts, poorly sorted lacustrine deposits, and the Pliocene Troutdale Formation.

Groundwater and surface water are believed to flow east, toward the Willamette River. In addition, a groundwater seep or spring located near the northern end of the property also flows toward the river. Local alluvium was deposited into Willamette and Columbia river floodplains. Aquifers in floodplain deposits generally are unconfined and localized due to the heterogeneity of the deposits (Jacobs Engineering, 2000).

6.0 SUBSURFACE INVESTIGATION RESULTS

GeoDesign's investigation included advancing direct push Geoprobe® borings B-1 and B-2 to a depth of 20.0 and 9.0 feet bgs, respectively; advancing six direct push monitoring well borings (MW-1 through MW-6) to depths ranging from 19.5 to 30 feet bgs; obtaining soil samples for laboratory analysis; and constructing six monitoring wells (MW-1 through MW-6) in the boreholes. Drilling services were provided by Geo-Tech Explorations, Inc. of Tualatin, Oregon. These activities were conducted to evaluate the potential for impact to soil and groundwater from the documented contamination discussed in Section 2.0 and shown on Jacob's figures in Appendix C. The results of the characterization activities are presented in the following sections. The boring and monitoring well locations are shown in Figure 2. The boring logs are included in Appendix A

6.1 SOIL SAMPLING

On April 13, 2003, soil samples were obtained continuously from each boring for field screening and classification. A portion of each sample was field-screened for potential VOCs using a photoionization detector (PID) and visual methods. Surface and subsurface soils consisted generally of moist, brown to gray silty sand with occasional gravels. Fill material is present across the entire site and ranges in depth from 9 to 30 feet bgs, according to our boring logs. The fill material is underlain by gray to brown sand and sandy silt with trace organics. Boring B-1, a 20-foot boring, encountered fill material to a depth of 18.5 feet bgs. The soil appeared wet at 17 feet bgs, and the soil graded from sand to silt below a depth of 18.5 feet bgs. Boring B-2, a 9-foot boring, was entirely in fill material, and the silty sand fill became wet at 7 feet.



Boring B-2 encountered drilling refusal at 9.0 feet bgs, possibly due to rip-rap, river gravels, or cobbles. Monitoring well boring MW-1 encountered 8 feet of fill material underlain by gray sand and silt before encountering drilling refusal in brown gravel at 19.5 feet bgs. Monitoring well boring MW-2, a 30-foot boring, encountered 24 feet of fill underlain by gray silty sand with gravel. Monitoring well boring MW-3 encountered 14 feet of fill, including wood and brick debris at approximately 7.5 feet bgs. The fill was underlain by brown to red sand and gray silt to the bottom of the borehole at 30 feet bgs. Monitoring well boring MW-4 was also a 30-foot boring, and it encountered brown and gray sand and gravel fill throughout its entire depth. Monitoring well boring MW-5 encountered 22 feet of fill underlain by gray sand to silty sand to the final depth of the boring at 30 feet bgs. Monitoring well boring MW-6 was advanced to a depth of 21.5 feet bgs, encountering 14 feet of fill underlain by gray silty sand and gray silt.

Continuous soil samples were obtained from the eight borings, and the soils were field-screened using visual examination and headspace vapor screening methods. Field headspace vapor screening was accomplished using a PID and recorded on the boring logs in Appendix A. Soil samples were selected for laboratory analysis, including one sample per boring from the groundwater interface and the sample having the highest PID reading. In the absence of a PID detection, only the sample from the groundwater interface was selected for analysis.

Using the above selection criteria, one soil sample each was selected from B-2, MW-3, MW-4, MW-5, and MW-6 for analysis, and two soil samples from B-1, MW-1, and MW-2 were selected for analysis. The soil samples were submitted under a chain-of-custody to NCA for analysis. One sample from each of the eight borings was analyzed for total 13 priority pollutant metals by EPA Method 6000/7000 series, and PAHs by EPA Method 8270M-SIM. Soil samples collected from B-1, B-2, MW-1, MW-2, and MW-4 were tested for diesel-range petroleum hydrocarbons by Method NWTPH-Dx. Soil samples collected from B-2, MW-2, and MW-6 were analyzed for VOCs by EPA Method 8260B. Specific laboratory results can be reviewed in Tables 2 and 3, and results are summarized in Section 7.2 below.

6.2 GROUNDWATER SAMPLING

6.2.1 Groundwater Monitoring Well Installation

Permanent groundwater monitoring wells were constructed in direct push borings MW-1 through MW-6 on March 21 and 24, 2003. Monitoring wells were constructed with 1.5-inch-inside diameter polyvinyl chloride casing and pre-packed well screens. The screened intervals of the monitoring wells range from 4.5 to 30 feet bgs. Aboveground well monuments were placed over locked well caps. Each aboveground monument is surrounded by three guard posts. The elevation of the top of the well casings was surveyed by Thurston & Associates (a licensed land surveyor). The monitoring well casing elevations are shown on Table 1. Well construction details are shown on the boring logs included in Appendix A.

6.2.2 Groundwater Monitoring and Sampling

GeoDesign conducted groundwater monitoring and sampling activities at the site on April 16, 2003. On May 8, 2003, groundwater levels in the wells were measured from the top of the casing to the nearest 0.01 foot using an electronic water level indicator. Groundwater elevation measurements are presented in Table 1.



The depth to groundwater in the monitoring wells ranged from 6.95 feet (MW-1) to 20.05 feet (MW-3) from the top of well casing. Converting these measurements to elevation based on a surveyed datum yielded groundwater elevations ranging from 11.86 feet above mean sea level (MSL) to 19.20 feet above MSL (MW-6). Groundwater elevations were plotted and hand contoured. The resulting groundwater flow direction is east-northeast toward the Willamette River at a gradient of approximately 0.045 vertical feet per lineal foot (ft/ft). The groundwater elevation contour map interpreted from the May 8, 2003 data is shown on Figure 3.

Before sample collection, each well was purged a minimum of three casing volumes of water using an electric peristaltic pump with dedicated tubing, while recording field readings of pH, temperature, electrical conductivity, and dissolved oxygen. When these parameters stabilized, groundwater samples were collected. Groundwater samples were collected directly from dedicated pump tubing and discharged into laboratory-supplied containers. Water samples submitted for total metals analysis were unfiltered.

Groundwater samples collected during the April 2003 monitoring event were transported under chain of custody to NCA of Beaverton, Oregon. The groundwater samples were analyzed for a variety of chemical parameters described in Section 3.0, including VOCs by EPA Method 8260B, PAHs by EPA Method 8270M-SIM, and 13 priority pollutant total metals by EPA Method 6010B/7000 series. Chemical analytical data for the groundwater samples submitted for the April 2003 event are presented in Tables 4 and 5 and discussed in Section 7.2 below. Laboratory data sheets, chain-of-custody records, and laboratory quality control documentation for the groundwater samples are presented in Appendix B.

7.0 CHEMICAL ANALYTICAL RESULTS

7.1 SOIL

Diesel and heavy oil range hydrocarbons were detected in three of the eight samples analyzed. Diesel was detected in MW-4 (18-19) at a concentration of 31.0 milligrams per kilogram (mg/Kg), heavy oil was detected in the samples from MW-1 (8-9) and MW-4 (18-19) at concentrations of 57.6 and 66.1 mg/Kg, respectively (Table 2). All detected concentrations were less than the DEQ's Level I Soil Matrix Cleanup Standard of 100 mg/Kg, which is the most stringent cleanup standard.

Three soil samples were analyzed for VOCs, including B-2 (7-9), MW-2 (18-20), and MW-6 (13-15). Of the three, only one VOC, 2-chlorotoluene, was detected in one sample (B-2 (7-9)) at a concentration of 266 mg/Kg (Table 3). The concentration of all other VOC analytes in sample B-2 (7-9) and all VOCs in samples MW-2 (18-20) and MW-6 (13-15) were below the method reporting limit (MRL). No EPA Region 9 PRG or DEQ Risk Based Concentration (RBC) were established for 2-chlorotoluene.

Eleven soil samples were submitted for PAH analysis (Table 3). Several PAHs were detected by the analysis, including the following:



- Acenaphthene was detected in 2 of the 11 samples at a concentration of 15.9 micrograms per kilogram (μ g/Kg) in MW-4 (18-19) and 45.3 μ g/Kg in B-1(8-10).
- Benzo(a)anthracene was detected in seven samples at concentrations ranging from $20.4 \mu g/Kg$ in B-1(17-18) to 111 $\mu g/Kg$ in B-2(7-9).
- Benzo(a)pyrene was detected in seven samples at concentrations ranging from 17.1 μg/Kg in B-1(17-18) to 138 μg/Kg in B-2 (7-9).
- Benzo(b)fluoranthene was detected in seven samples at concentrations ranging from 18.5 μ g/Kg in B-1(17-18) to 85.2 μ g/Kg in MW-6 (13-15).
- Benzo(ghi)perylene was detected in seven samples at concentrations ranging from 18.6 μ g/Kg in B-1(17-18) to 149 μ g/Kg in MW-6 (13-15).
- Benzo(k)fluoranthene was detected in six samples at concentrations ranging from 18.8 μ g/Kg in MW-1(8-9) to 89.9 μ g/Kg in B-2 (7-9).
- Chrysene was detected in seven samples at concentrations ranging from 24.6 μ g/Kg in B-1(17-18) to 139 μ g/Kg in B-2 (7-9).
- Fluoranthene was detected in seven samples at concentrations ranging from 76 μ g/Kg in B-1(17-18) to 310 μ g/Kg in B-1(8-10).
- Fluorene was detected in two samples at a concentration of 14.2 μ g/Kg in B-1 (17-18) and 14.3 μ g/Kg in MW-4 (18-19).
- Indeno(1,2,3-cd)pyrene was detected in six samples at concentrations ranging from 19.2 μ g/Kg in MW-1 (8-9) to 100 μ g/Kg (MW-6 (13-15).
- Phenanthrene was detected in six samples at concentrations ranging from 27.0 μ g/Kg in MW-4 (18-19) to 144 μ g/Kg in B-1 (8-10).
- Pyrene was detected in seven samples at concentrations ranging from 61.6 μ g/Kg in MW-1(8-9) to 327 μ g/Kg in B-1(8-10).

The concentrations of PAHs were all below the PRGs and applicable DEQ RBCs shown on Table 3.

Various metals were detected in the soil samples obtained from <u>B</u>-1, B-2, MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6 as shown on Table 2 and summarized below:

- Antimony was below the MRL in all but one sample, B-2 (7-9) at 8.99 mg/Kg.
- Arsenic was detected in all eight samples at concentrations ranging from 1.66 mg/Kg in MW-1 (8-9) to 2.91 mg/Kg in MW-3 (19-20).
- Beryllium was detected in four samples at concentrations ranging from 0.298 mg/Kg in MW-4 (18-19) to 0.742 mg/Kg in MW-1 (8-9).
- Cadmium was detected in one sample, B-2 (7-9), at a concentration of 5.39 mg/Kg.
- Chromium was detected in all eight samples at concentrations ranging from 11.3 mg/Kg in MW-4 (18-19) to 22.9 mg/Kg in MW-1 (8-9).
- Copper was detected in all eight samples at concentrations ranging from 15.9 mg/Kg in B-1(8-10) to 35.7 mg/Kg at MW-2 (18-20).
- Lead was detected in all eight samples at concentrations ranging from 4.04 mg/Kg in MW-2 (18-20) to 11.1mg/Kg in MW-6 (13-15).
- Mercury was detected in one sample, MW-4 (18-19), at a concentration of 0.182 mg/Kg.
- Nickel was detected in all eight samples at concentrations ranging from 13.6 mg/Kg in MW-1 (8-9) to 23.4 mg/Kg in MW-5 (22-23).



- Selenium, silver, and thallium were all below the MRLs in all tested samples.
- Zinc was detected in all eight samples at concentrations ranging from 51.0 mg/Kg in MW-3 (19-20) to 92.4 mg/Kg in B-2(7-9).

Of the detected metals, only the concentration of arsenic exceeds the EPA Region 9 Industrial PRG of 1.6 mg/Kg. However, the highest detected arsenic concentration of 2.91 mg/Kg is within the range of regional naturally-occurring arsenic concentrations shown on Table 6. The lead concentration in all samples is less then the Region 9 PRG of 750 mg/Kg, but it exceeds the DEQ's generic RBC of 1.5 mg/Kg for the leaching to groundwater pathway. Nevertheless, no leachable lead was detected above the MRL by the Toxic Characteristic Leaching Procedure (TCLP), showing that lead at the site is not leachable (Table 2).

7.2 GROUNDWATER

Groundwater quality beneath the project site was characterized by sampling six groundwater monitoring wells. The groundwater samples were obtained from MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6 on April 15, 2003, and then were submitted to NCA under a chain of custody. All samples were submitted for analysis of 13 priority pollutant total metals by EPA Method 6010B/7000 series and PAHs by EPA Method 8270M-SIM. Groundwater samples collected from monitoring wells MW-2 and MW-6 were also analyzed for VOCs by EPA Method 8260B. Results are presented in Tables 4 and Table 5 and summarized below.

Various metals were detected in the water samples collected from monitoring wells MW-2, MW-3, MW-4, MW-5, and MW-6 as follows:

- Antimony was detected only in sample MW-4 at a concentration of 0.00101milligrams per liter (mg/L).
- Arsenic was detected in MW-2, MW-3, MW-4, and MW-5 at concentrations ranging from 0.0012 mg/L in MW-3 to 0.0195 mg/L in MW-4.
- Beryllium was detected only in sample MW-4 at a concentration of 0.00357 mg/L.
- Cadmium was detected only in sample MW-4 at a concentration of 0.00202 mg/L.
- Chromium was detected in the samples from MW-3 and MW-4 at concentrations of 0.00183 and 0.182 mg/L, respectively.
- Copper was detected in three samples at concentrations ranging from 0.00218 mg/L in MW-3 to 0.435 mg/L in MW-4.
- Lead was detected in three samples at concentrations ranging from 0.00117 mg/L in MW-3 to 0.692 mg/L in MW-4.
- Mercury was detected only in MW-4 at a concentration of 0.000973 mg/L.
- Nickel was detected in MW-3 and MW-4 at concentrations of 0.00413 and 0.139 mg/L, respectively.
- Selenium was detected in MW-4 and MW-5 at concentrations of 0.00103 and 0.00119 mg/L, respectively.
- Silver was detected in MW-2 and MW-4 at concentrations of 0.00138 and 0.0149 mg/L, respectively.
- Thallium was not detected above the MRL in any of the samples analyzed.
- Zinc was detected in MW-3 and MW-4 at concentrations of 0.00774 and 0.635 mg/L, respectively.



Only the concentration of arsenic in MW-2, MW-3, MW-4, and MW-5 exceeded the EPA Region 9 Tapwater PRG of 0.000045 mg/L. However, the highest detected concentration of arsenic (0.0195 mg/L) at the site is within the range of regional naturally-occurring arsenic concentrations shown on Table 6. In addition, only the concentration of lead in MW-4 (0.692 mg/L) exceeded the DEQ's groundwater ingestion RBC of 0.015 mg/L for the occupational receptor. A beneficial water ruse determination will be needed to determine if the groundwater ingestion pathway is complete at the site.

The maximum detected concentrations of chromium, copper, lead, mercury, nickel, silver, and zinc exceed DEQ's ecological risk levels for aquatic plants, invertebrates, and wildlife as shown on Table 4. An ecological risk assessment may be necessary to determine whether or not any ecological receptors are found at the site that could be at risk to the total metals concentrations. But first, filtered groundwater samples will be submitted for dissolved metals analysis to determine if concentrations still exceed ecological risk levels.

PAHs were detected in the groundwater samples obtained from MW-3, MW-4, and MW-5 as shown on Table 5 and summarized below.

- Acenaphthene was detected in three samples at concentrations ranging from 0.196 micrograms per liter ($\mu g/L$) in MW-5 to 0.808 $\mu g/L$ in MW-4.
- Benzo(ghi)perylene was detected only in sample MW-4 at a concentration of 0.10 μ g/L.
- Naphthalene was detected only in MW-4 at a concentration of 0.135 µg/L.
- Phenanthrene was detected in three samples at concentrations ranging from 0.117 μ g/L in MW-3 to 0.277 μ g/L in MW-5.
- Pyrene was detected in three samples at concentrations ranging from 0.649 μ g/L in MW-4 to 1.11 μ g/L in MW-3.

None of the detected PAH concentrations exceeded the EPA Region 9 PRGs or DEQ RBCs. Acenapthene, fluoranthene, and phenanthrene exceeded the DEQ's ecological risk levels for aquatic plants, invertebrates, and wildlife as shown on Table 5. An ecological risk assessment may be necessary to determine whether any ecological receptors are found at the site that are at risk to these PAH concentrations.

VOCs were not detected above MRLs in the groundwater samples collected from MW-2 and MW-6.

8.0 CONCLUSIONS AND RECOMMENDATIONS

GeoDesign has completed a Phase II ESA which addresses subsurface soil and groundwater underlying the upland portion of the Marine Finance site located in Portland, Oregon. Except for collection of surface soil samples, the investigation followed DEQ's recommended scope of work to complete the XPA performed by Jacobs and included the following tasks:



- Soil sampling from at least two discrete depth intervals at locations with the highest contaminant levels in surface soil and from the former UST location.
- Installation of six groundwater monitoring wells across the eastern side of the property to assess groundwater contaminants potentially discharging to the Willamette River and determine groundwater flow direction and gradient.
- Collection of groundwater samples from the six monitoring wells.
- Laboratory analysis of soil and groundwater samples for diesel- and heavy oil-range hydrocarbons, VOCs, PAHs, and 13 priority pollutant total metals.
- Comparison of analytical results to applicable DEQ RBCs and EPA Region 9 PRGs.

The results of the Phase II ESA are as follows:

- Seven to 30 feet of apparent Columbia River dredge fill consisting of sandy silt with some gravel underlies the site. The fill appears to increase in thickness toward the river front. The fill is underlain by moist to wet sand, sandy silt, silt, and gravel. Groundwater was encountered in the borings at depths ranging from 7 to 20 feet bgs on western and eastern portions of the site, respectively.
- The depth to groundwater in monitoring wells ranged from 6.95 feet (MW-1) to 20.05 feet (MW-3) from the top of well casing. Converting these measures to elevation based on a surveyed datum yielded groundwater elevations ranging from 11.86 feet above MSL in MW-4 to 19.20 feet above MSL in MW-6. The resulting groundwater flow direction is east-northeast toward the Willamette River at a gradient of approximately 0.045 ft/ft).
- Diesel- and/or heavy oil-range hydrocarbons detected in soil samples collected near the
 former ferry ramp (MW-1(8-9)) and in the vicinity of the UST pipeline (MW-4 (18-19)) are below
 the DEQ's Level I Soil Matrix Cleanup Standard of 100 mg/Kg. Furthermore, PAH
 concentrations detected in these two borings and other borings advanced at the site are
 below the DEQ's most stringent RBCs and the EPA Region 9 PRGs.
- Of the several priority pollutant metals detected in soil samples collected at the site, only the concentrations of arsenic slightly exceed the EPA Region 9 industrial PRG of 1.6 mg/Kg. The arsenic detected in these soil samples at concentrations ranging from 1.66 to 2.91 mg/Kg are within the range of naturally-occurring arsenic.
- Total lead detected in the soil samples exceeds the DEQ's RBC of 1.5 mg/Kg for the soil leaching to groundwater pathway, occupational scenario. However, no leachable lead was detected in any of the samples submitted for TCLP analysis. This analysis indicates that the lead at the site is not leachable.
- Two or more priority pollutant total metals were detected in groundwater samples collected from five of the monitoring wells (MW-2 through MW-6). Of the metals, only the concentrations of arsenic exceeded the EPA Region 9 Tap Water PRG of 0.000045 mg/L. The arsenic detected in these samples at concentrations ranging from 0.00139 mg/L (MW-2) to 0.0195 mg/L (MW-4) are within the range of naturally-occurring arsenic and are probably due to suspended sediment particles in the sample. Similarly, the total lead concentration in one sample (MW-4) exceeds the DEQ's groundwater ingestion RBC of 0.015 mg/L for the occupational scenario. The lead detected in this sample may be due to lead in suspended sediment particles in the groundwater sample.



- The low concentrations of PAHs detected in groundwater samples from three wells are all below the DEQ's RBCs for all groundwater pathways and the EPA Region 9 Tap Water PRGs. No VOCs were detected above MRLs in the two groundwater samples analyzed.
- Chromium, copper, lead, mercury, nickel, silver, zinc, acenapthene, fluoranthene, and phenanthrene exceeded DEQ ecological risk levels for aquatic plants, invertebrates, and wildlife.

Based on the results of our findings it is our opinion that the following tasks be completed.

- Conduct the second quarter of groundwater monitoring in July or October 2003. Submit the samples for the same suite of analyses conducted during the first quarter, with the addition of analysis for dissolved metals to determine if arsenic and lead in groundwater exceeds PRGs and DEQ's RBCs.
- Collect surface soil samples at approximately 10 locations as recommended by DEQ. Submit
 the samples for NWTPH-HCID analysis and request follow-up TPH analysis based on HCID
 detections, e.g. NWTPH-Dx for diesel and heavy oil. Perform PAH analysis on those samples
 with TPH-Dx detections. Submit soil samples for analysis of lead and arsenic only. Perform
 follow-up analysis of samples for TCLP lead. Collect and analyze at least 2 of the 10 samples
 from areas outside of potential contamination area and utilize as background metals
 concentrations.
- Conduct further assessment of aquatic ecological risks by submitting aqueous samples for dissolved metals. Then as necessary, conduct a Level I Scoping Ecological Risk Assessment.
- Complete a Beneficial Water Use Determination.

9.0 LIMITATIONS

This environmental services report has been prepared for Marine Finance Corporation c/o Digital Video Systems. This report is not intended for use by others, and the information contained herein is not applicable to other sites. Our interpretations of subsurface conditions are based on data from select soil samples obtained from this limited area. The results of the analyses only indicate the presence or absence of petroleum hydrocarbons and related compounds in those discrete sample locations. Analytical data from the laboratory samples should only be considered as indicators of site conditions and not a guarantee of the absence of subsurface impact in areas not sampled.

The conclusions presented in this report are based on our observations made during field investigations and chemical analytical data. The findings of this assessment should be considered as a professional opinion based on our evaluation of selected and limited data.

Our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

We appreciate the opportunity to be of service to you. Please call if you have questions regarding this report.

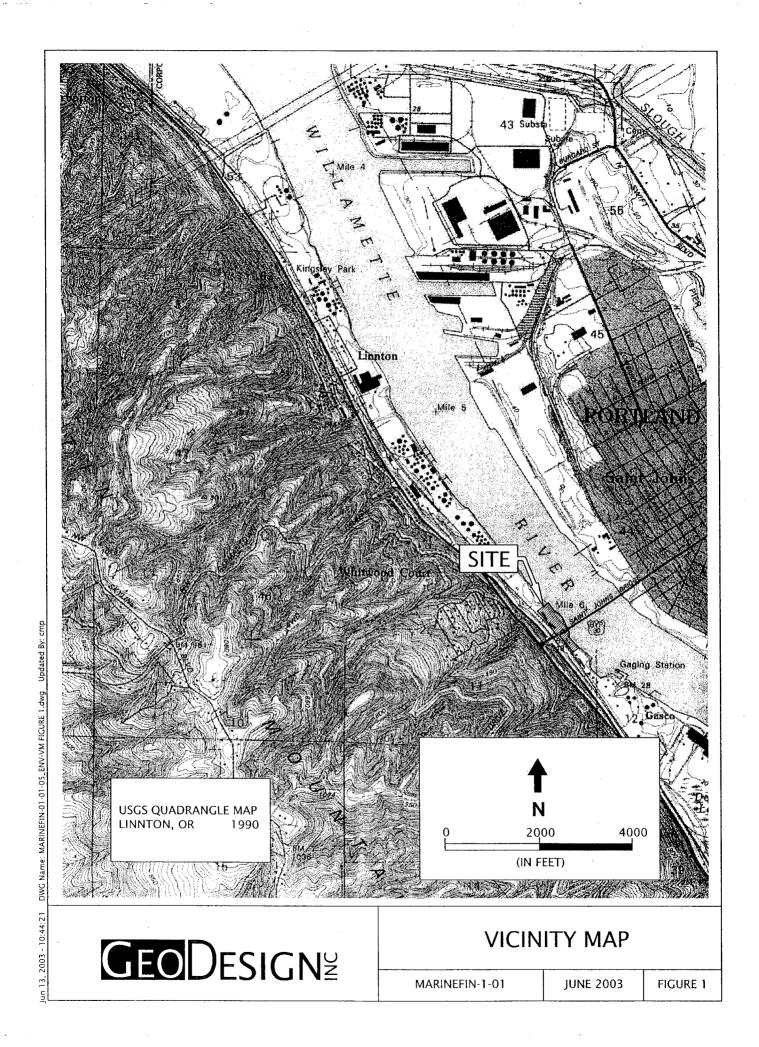
Sincerely,

GeoDesign, Inc.

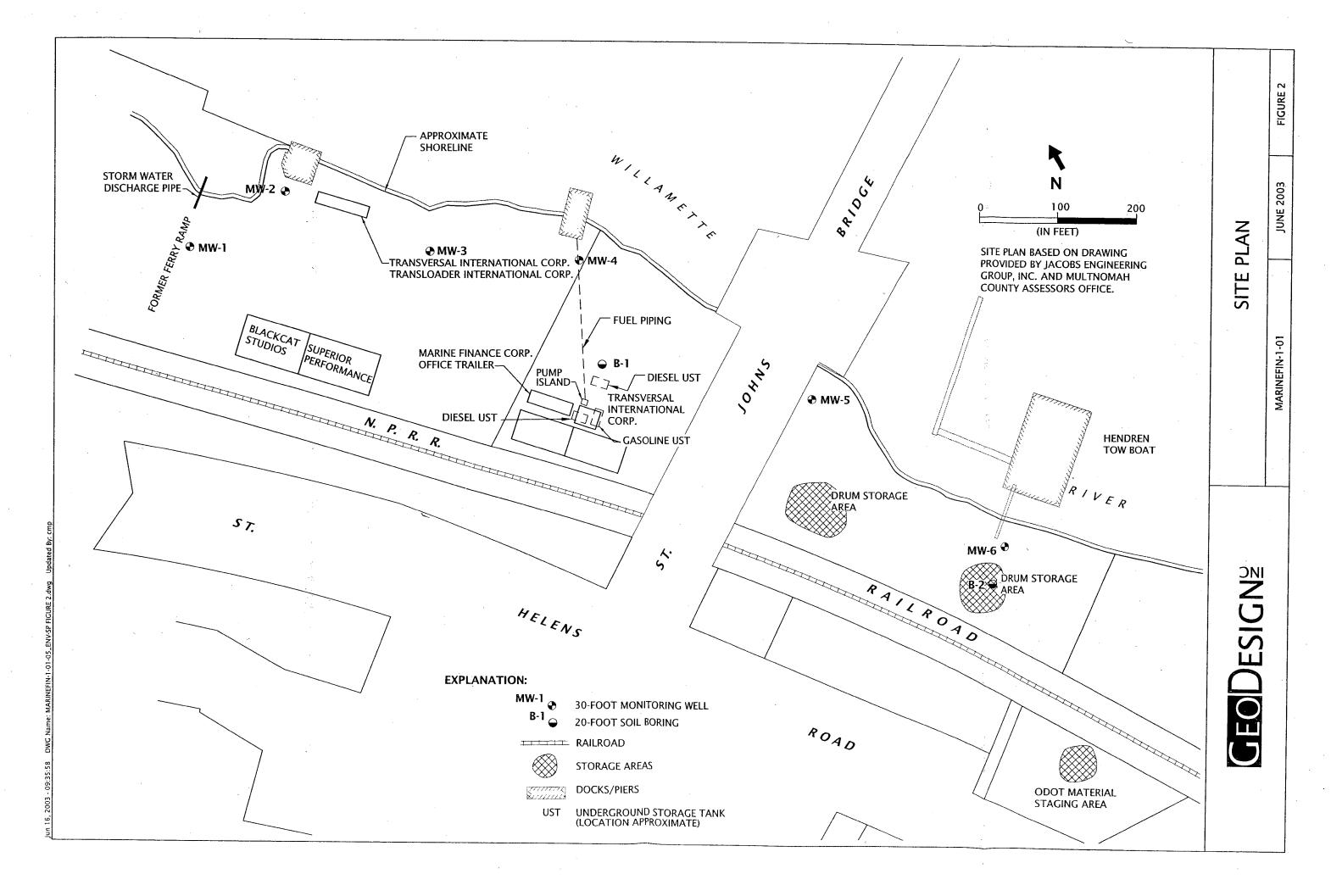
Paul M. Trone, R.G. Project Geologist

Robert E. Belding, R.G Principal Geologist





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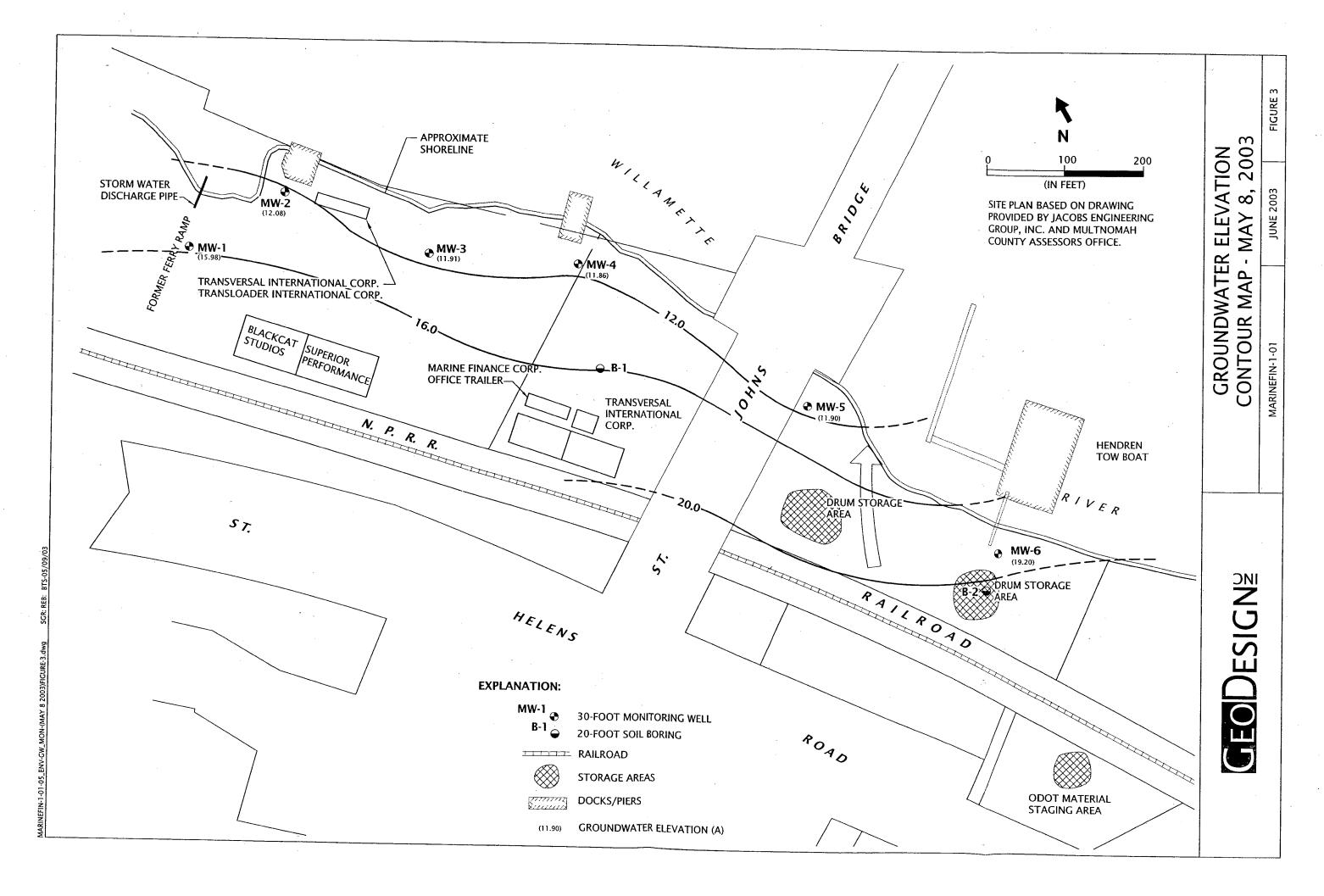


TABLE 1 Groundwater Elevation Data Marine Finance Corporation Site Portland, Oregon

Well ID	Date	Top of Casing Elevation (feet above MSL)	Depth to Water (feet)	Groundwater Elevation (feet above MSL)			
MW-1	05/08/03	22.93	6.95	15.98			
MW-2	05/08/03	31.63	19.55	12.08			
MW-3	05/08/03	31.96	20.05	11.91			
MW-4	05/08/03	31.56	19.70	11.86			
MW-5	05/08/03	31.85	19.95	11.90			
MW-6	05/08/03	30.95	11.75	19.20			

Notes:

--: not applicable

MSL: mean sea level



TABLE 2 Summary of Subsurface Soil Analytical Data Petroleum Hydrocarbons and Total Metals Marine Finance Corporation Site Portland, Oregon

Sample I.D.	Date De	Sample Depth	Diesel Range Hydrocarbons per NWTPH-Dx Method	Heavy Oil Range Hydrocarbons per	Total Metals by EPA Method 6000/7000 Series (mg/Kg)													TCLP Metals by EPA Method 1311/6000/7000 Series
		(feet)	(mg/Kg)	(mg/Kg)	Antimony (mg/Kg)	Arsenic (mg/Kg)	Beryllium (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Lead (mg/Kg)	Mercury (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Silver (mg/Kg)	Thallium (mg/Kg)	Zinc (mg/Kg)	Lead (mg/L)
B-1 (8-10)	03/24/03	8-10	ND<25.0	ND<50.0	ND<0.500	2.42	0.376	ND<0.370	13.2	15.9	4.73	ND<0.100	17.9	ND<0.370	ND<0.500	ND<0.500	62.8	
B-1 (17-18)	03/24/03	17-18	ND<25.0	ND<50.0														
B-2 (7-9)	03/24/03	7-9	ND<25.0	ND<50.0	8.99	2.27	0.375	5.39	16.4	17.1	5.82	ND<0.0893	18.5	ND<0.305	ND<0.355	ND<0.355	92.4	
MW-1 (8-9)	03/21/03	8-9	ND<25.0	57.6	ND<0.500	1.66	0.742	ND<1.95	22.9	18.3	10.5	ND<0.100	13.6	ND<0.321	ND<0.500	ND<0.500	55.8	ND<0.100
MW-1 (14-15)	03/21/03	8-9	ND<25.0	ND<50.0				-										
MW-2 (18-20)	03/21/03	18-20	ND<25.0	ND<50.0	ND<0.309	2.31	ND<0.431	ND<0.431	14.2	35.7	4.04	ND<0.0862	16.9	ND<0.431	ND<0.309	ND<0.309	63.6	
MW-2 (23-25)	03/21/03	18-20	ND<25.0	ND<50.0													 .	
MW-3 (19-20)	03/21/03	19-20			ND<0.329	2.91	ND<0.397	ND<0.397	13.2	16.8	2.24	ND<0.0893	17.0	ND<0.397	ND<0.329	ND<0.329	51.0	
MW-4 (18-19)	03/21/03	18-19	31.0	66.1	ND<0.350	2.67	0.298	ND<0.286	11.3	17.5	7.78	0.182	15.7	ND<0.286	ND<0.350	ND<0.350	52.8	ND<0.100
MW-5 (22-23)	03/21/03	22-23	· · · ·		ND<0.397	1.76	ND<0.394	ND<0.394	19.2	20.0	5.92	ND<0.100	23.4	ND<0.394	ND<0.397	ND<0.397	58.2	
MW-6 (13-15)	03/21/03	13-15			ND<0.329	1.97	ND<0.413	ND<0.413	15.9	18.6	11.1	ND<0.0862	21.3	ND<0.413	ND<0.329	ND<0.329	52.8	ND<0.100
DEQ Level I Soil N	Matrix Cleanup	Standards	100	100										7				
DEQ Generic RBC	.s								<u> </u>	· · · · · · · · · · · · · · · · · · ·	L			L		<u> </u>		<u></u>
Soil Ingestion, Der Occupational	rmal Inhalation -							,			1,000			. .				
Soil Ingestion, Der Worker	rmal Inhalation	Excavation									1,000							
Soil Volatization to	o Outdoor Air										NA NA						, <u></u>	
Soil Vapor Intrusti	ion into Building	S									NA.			-#				
Soil Leaching to G											1,5			:				'
DEQ Soil Leachat	e Reference Co	ncentration												1				2
EPA Region 9 PRO	Gs (Industrial)				410	1.6a	1,900	450'	450	41,000	750	310	20000b	5.100	5,100	67	100,000	

Notes:

--: not analyzed

a - arsenic cancer endpoint

b - nickel soluble salts

DEQ: Oregon Department of Environmental Quality

EPA: U.S. Environmental Protection Agency

mg/Kg: milligrams per kilogram NA: not applicable

ND: Not detected above laboratory reporting methods.

PRGs: preliminary remediation goals

RBCs: risk-based concentrations



TABLE 3 Summary of Subsurface Soil Analytical Data VOCs and PAHs Marine Finance Corporation Site Portland, Oregon

Sample I.D.	Date	Sample Depth	/ ///>	PAHs by EPA Method 8270SIM (μg/Kg)												
		(feet)	2-Chlorotoluene	Acenaphthene	Benzo- (a)anthracene	Benzo- (a)pyrene	Benzo (b)fluoranthene	Benzo- (ghi)perylene	Benzo- (k)fluoranthene	Chrysene	Fluoranthene	Fluorene	Indeno- (1,2,3-cd)pyrene	Phenanthrene	Pyrene	
B-1 (8-10)	03/26/03	8-10		45.3	104	114	72.8	91.6	71.2	139	310	ND<26.8	66.9	144	327	
B-1 (8-10) B-1 (17-18)	03/26/03	17-18		ND<40.2	20.4	17.1	18.5	18.6	ND<13.4	24.6	76	14.2	ND<13.4	83.0	72.8	
	03/24/03	7-9	266	ND<26.8	111	138	82.6	117	89.9	139	254	`ND<26.8	82.3	ND<26.8	293	
B-2 (7-9)	03/24/03	8-9		ND<13.4	24.8	29.5	21.9	26.2	18.8	32.5	49.2	ND<13.4	19.2	42.8	61.6	
MW-1 (8-9) MW-1 (14-15)	03/21/03	14-15		ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	
	03/21/03	18-20	ND< 100	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	
MW-2 (18-20)	03/21/03	23-25	**	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	
MW-2 (23-25)	03/21/03	19-20		ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	
MW-3 (19-20)	03/21/03	18-19		15.9	43.4	59.7	35.5	62.6	41.5	55.6	51.5	14.3	43.2	27.0	102	
MW-4 (18-19)	03/21/03	22-23		ND<13.4	35.4	57.9	32.4	57.9	34.8	47.3	88.8	ND<13.4	38.8	38.6	137	
MW-5 (22-23)	03/21/03	13-15	ND< 100	ND<26.8	70.2	124	85.2	149	71.4	98.5	137	ND<26.8	100	60.7	169	
MW-6 (13-15) DEQ Generic RBC		1 13 13										<u></u>		T		
Soil Ingestion, Der	mal Contact, a	nd		25,000,000a	2,700	270	2,700		27,000a	270,000a	29,000,000a	23,000,000a	2,700a		21000000a	
Inhalation - Occupa			 	110,000,000a	270.000a	27,000a	2,700,000a		2,700,000a	27,000,000a	110,000,000a	94,000,000a	270,000a		84000000a	
Soil Ingestion - Exc				100,000b	19,000b	8,300b	9,200b		4,900b	3,200b	110,000b	140,000b	380b		71000b	
Volatilization to O				100,000b	19,000b	8,300b	9,200b		4,900b	3,200b	110,000b	140,000b	380b		71000b	
Vapor Intrusion in				100,000b	19,000b	5,200b	9,200b		4,900b	3,200b	110,000b	140,000b	380b		71000b	
Soil Leaching to G EPA Region 9 Ind				29,000,000	2,100	210	2,100		21,000	210,000	22,000,000	26,000,000	2,100		29,000,000	

Notes:

a: >Csat. The soil RBC exceeds three-phase equilibrium partitioning. Soil concentrations in excess of Csat indicate that free product may be present.

b: =Csat. This number is not a risk-based concentration

DEQ: Oregon Department of Envriornmental Quality

EPA: U.S. Environmental Protection Agency

mg/Kg: milligrams per kilogram

ND: Not detected above laboratory reporting methods.

PAHs: polynuclear aromatic hydrocarbons

PRG: preliminary remediation goal

RBCs: risk-based concentrations

µg/Kg: microgram per kilogram

VOCs: volatile organic compunds

GEO DESIGNE

MarineFin-1-01:061603

TABLE 4 Summary of Groundwater Analytical Data Total Metals Marine Finance Corporation Site Portland, Oregon

Sample I.D.	Sample Date	Total Metals by EPA Method 6000/7000 Series (mg/L)												
		Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
MW-1	04/15/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00500
MW-2	04/15/03	ND<0.00100	0.00139	ND<0.00100	N D<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	ND<0.00100	0.00138	ND<0.00100	ND<0.00500
MW-3	04/15/03	ND<0.00100	0.0012	ND<0.00100	ND<0.00100	0.00183	0.00218	0.00117	ND<0.000200	0.00413	ND<0.00100	ND<0.00100	ND<0.00100	0.00774
MW-4	04/15/03	0.00101	0.0195	0.00357	0.00202	0.182	0.43500	0.692	0.000973	0.139	0.00103	0.01490	ND<0.00100	0.63500
MW-5	04/15/03	ND<0.00100	0.00286	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	0.00119	ND<0.00100	ND<0.00100	ND<0.00500
MW-6	04/15/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	0.00227	0.00173	ND<0.000200	0.00303	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00500
DEQ Generic RBC :	S													
Groundwater Inges	tion - Occupational	*-						0.015			- vc			•
Ecological Risk, Aq	uatic	1.6	0.15	0.0053	0.0022	0.011	0.009	0.0025	0.00077	0.052	0.005	0.00012	0.04	0.12
EPA Region 9 Tap	Water PRGs	0.015	0.000045	0.073	0.018	55*	1.5		0.011	0.73**	0.18	0.18	0.024	11

Notes:

*: Chromium III

**: Soluble Salts

--: not analyzed/applicable

DEQ: Oregon Department of Environmental Quality

EPA: U.S. Environmental Protection Agency

mg/L: milligrams per liter

ND: Not detected above laboratory reporting methods.

RBCs: risk-based concentrations
PRG: preliminary remediation goal

TABLE 5 Summary of Groundwater Analytical Data PAHs and VOCs Marine Finance Corporation Site Portland, Oregon

Sample I.D.	Date	PAHs by EPA Method 8270SIM (μg/L)										
		Acenaphthene	Benzo- (ghi) perylene	Chrysene	Fluoranthene	Naphthalene	Phenanthrene	Pyrene	Others	All		
MW-1	04/15/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND			
MW-2	04/15/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND	ND		
MW-3	04/15/03	0.490	ND<0.100	ND<0.100	0.795	ND<0.100	0.117	1.11	ND			
MW-4	04/15/03	0.808	0.100	0.113	0.168	0.135	0.134	0.649	ND			
MW-5	04/15/03	0.196	ND<0.100	ND<0.100	0.134	ND<0.100	0.277	0.666	ND			
MW-6	04/15/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND	ND		
DEQ Generic RBCs												
Groundwater Ingestion - Occ	upational	2,700		17a	1,800a	890		1,300a	Varies			
Volatilization to Outdoor Air		4,200b	•-	2b	210b	31,000b		140b	Varies			
Vapor Intrusion into Building	s - Occupational	4,200b		2b	210b	31,000b		140b	Varies			
Ingestion and Inhalation fron Occupational	n Tap Water -	620		••		8.7		·	Varies			
Groundwater in Excavation - Excavation Worker		4,200b		2b	210b	240b		140b	Varies			
Ecological Risk, Aquatic		0.52			0.00616	0.62	0.0063					
EPA Region 9 Tap Water PR	Gs	370		9.2	1,500	6.2	••	180	Varies	<u></u>		

Notes:

- --: not analyzed/applicable
- a: >S. This groundwater RBC exceeds the solubility limit. Groundwater concentrations in excess of S indicate that free product may be present.
- b: =S. This number is not a risk-based concentration.
- DEQ: Oregon Department of Environmental Quality
- EPA: U.S. Environmental Protection Agency
- ND: Not detected above laboratory reporting methods.
- PAHs: polynuclear aromatic hydrocarbons
- PRG: preliminary remediation goal
- RBCs: risk-based concentrations
- µg/L: micrograms per liter
- VOCs: volatile organic compunds



TABLE 6 Summary of Regional Naturally-occurring Arsenic Concentrations Marine Finance Corporation Site Portland, Oregon

Media	Location	Sample Population		enic Concentra (mg/Kg or µg/i		Reference	
		Population	Median	Low	High		
	Mears Trust Site, Beaverton	11	3.7	0.5	5.2	GeoDesign, 2000	
	Sexton Mountain, Beaverton	45	3.2	0.1	7.1	GeoDesign, 2001	
	Oregon, State-wide	[10.0	Baldwin and McCreary, 1998	
C - !!	Oregon, State-wide	34	5.1	1.2	10.3	Shacklette and Boerngen, 1984	
Soil	Clark County, Washington		5.8			Juan, 1994	
	The Round, Beaverton	19	6.2	1.1	36.5	Squier, 1993; Squier, 1995; URS, 2002	
	Durham Quarry, Tigard	7	<2.00	<1.85	<2.00	GeoDesign, 2003	
	On Site	8	2.29	1.66	2.91	This Study	
Sediment	Tualatin River Subbasin	22	7.2	2.0	16.0	Bonn, 1999	
Surface Water	Tualatin River Subbasin	1,140	3.0			DEQ, 2001	
	Mears Trust Site, Beaverton	7	38.6	1.6	115	GeoDesign, 2000	
	Sexton Mountain, Beaverton	15	8.8	2.0	19.3	GeoDesign, 2001	
	Willamette Basin	728	68.3	<1	2,000	Hinkle and Pollette, 1999	
Groundwater	Tualatin River Subbasin			<1	77	Hinkle and Pollette, 1999	
	The Round, Beaverton	7	50.6	2.5	186	URS, 2002	
	Durham Quarry, Tigard	3	2.33	1.83	4.16	GeoDesign, 2003	
	On Site	6	1.3	1.0	19.5	This Study	

Notes:

--: not applicalble/available

mg/Kg: milligrams per kilogram. Applies to soil and sediment concentrations.

μg/L: micrograms per liter. Applies to surface water and groundwater concentrations.



APPENDIX A

SUBSURFACE EXPLORATIONS

Geoprobe® explorations were completed at the site on April 4, 2003. The explorations were completed using a direct push technology drill rig owned and operated by Geo-Tech Explorations of Tualatin, Oregon. The approximate push probe boring locations are shown on Figure 2.

A GeoDesign field representative observed the explorations and obtained soil samples from all of the push probe borings. The soils encountered in the Geoprobe® borings were visually classified in general accordance with guidance provided in American Society for Testing and Materials D 2488.

SOIL SAMPLING

Soil samples were obtained continuously from the borings using a 5-foot driven tube with a plastic liner. The sampler was driven inside the drill casing and soil samples were removed at the completion of the 5-foot section. A portion of each sample was used for field screening. Another portion of each sample was immediately placed in laboratory prepared glass jars with Teflon-lined lids. The jars were packed full to eliminate headspace in the containers. The soil samples were immediately placed in a cooler with ice and were transferred to the GeoDesign refrigerator pending groundwater analytical results. Chain-of-custody procedures were followed during handling and transport of the samples.

The equipment used for soil sampling was cleaned between each boring location with a detergent wash and a tap water rinse. The GeoDesign representative wore new nitrile gloves during sample collection procedures.

SOIL SAMPLE FIELD SCREENING METHODS

The GeoDesign field representative performed field-screening tests on portions of the soil samples obtained from the borings. Field screening results are used as a field method to identify possible contamination in soil samples and to aid in selection of soil samples for chemical analysis. The field screening methods used included visual examination and headspace vapor screening using a hand-held Mini Rae Model PGM-76IS PID.

Visual screening typically involves inspecting the soil sample for visual indications of petroleum contamination, such as staining. Visual screening is typically more effective when soil samples are heavily contaminated, which generally results in staining.

Headspace vapor screening consists of placing a soil sample in a plastic bag and capturing air in the bag. The bag is then sealed and shaken to expose the atmosphere in the bag to VOCs in the soil. The PID intake probe is then inserted into the bag to measure the concentration of VOCs in the bag headspace.



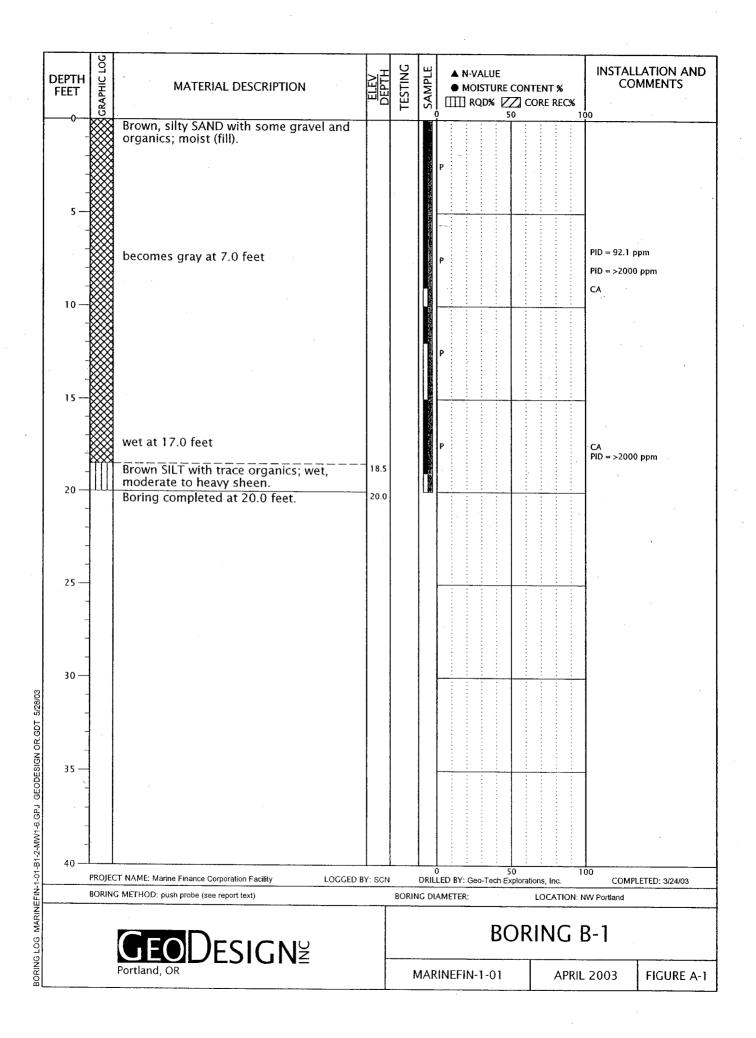
GROUNDWATER SAMPLING

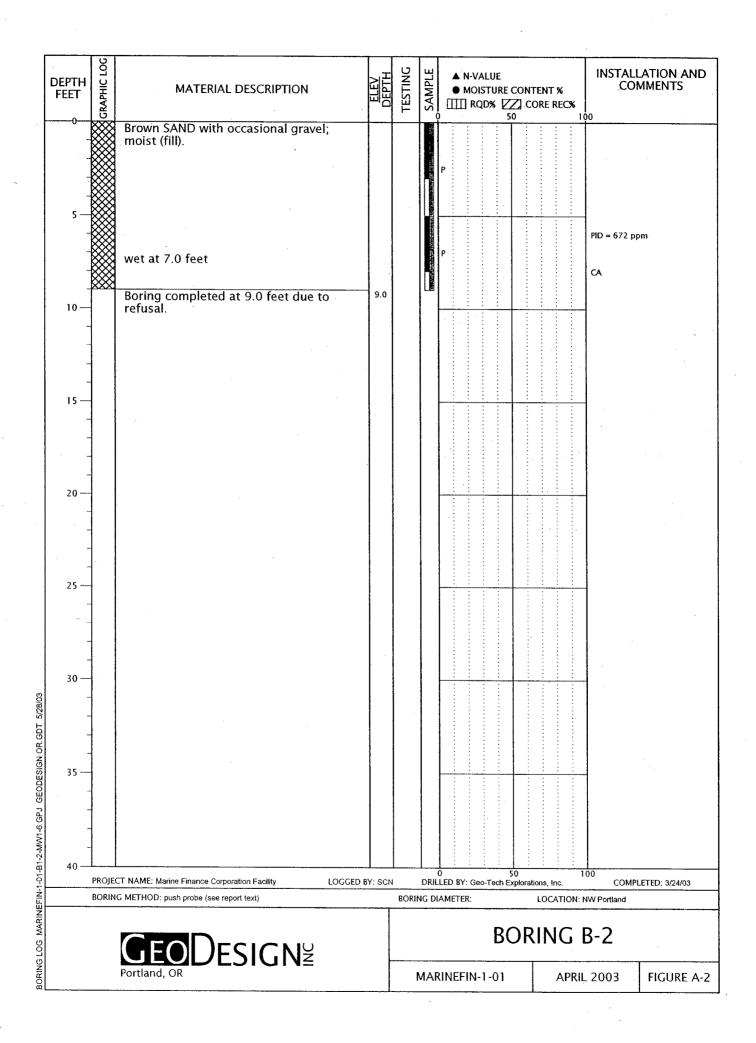
Before purging and sampling, groundwater levels in the monitoring wells were measured from a permanent mark on top of the casing to the nearest 0.01 foot using an electronic water level indicator. Before sample collection, all wells were purged of water using low-flow purging techniques with a peristaltic pump, while recording field parameters of pH, temperature, electrical conductivity, and dissolved oxygen. When the field parameters stabilized, groundwater samples were collected using the peristaltic pump and clean, disposable tubing. Groundwater samples from the wells were discharged into laboratory-supplied containers, which were placed in an iced cooler and submitted under chain of custody to the laboratory.

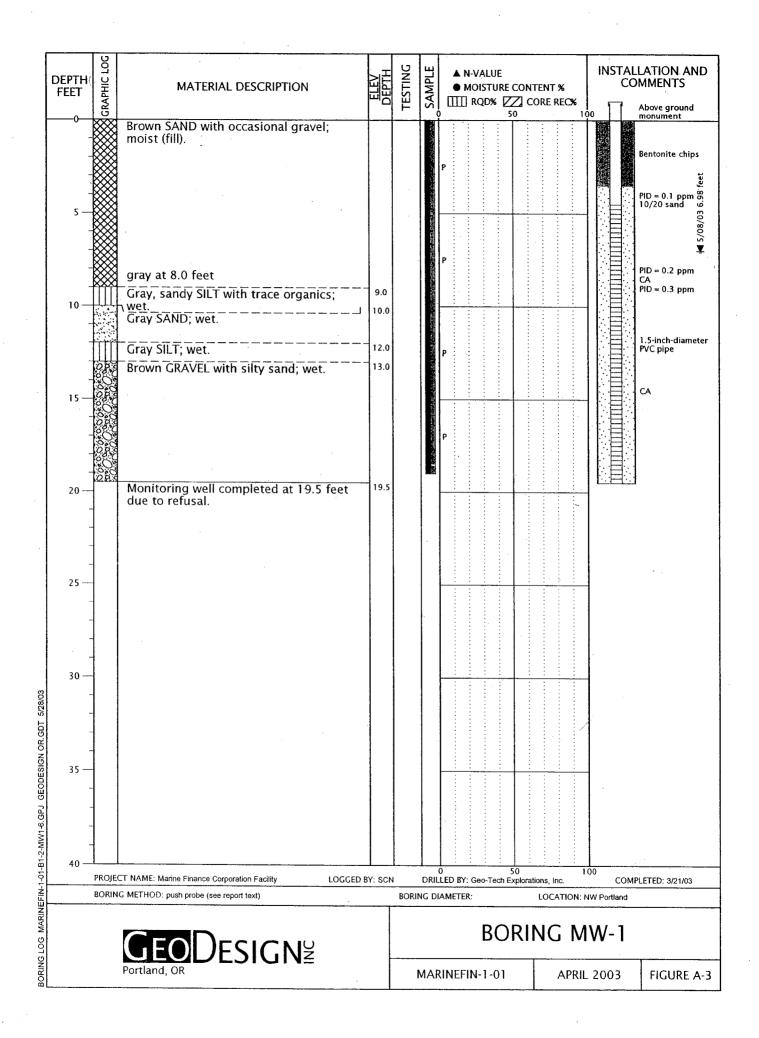


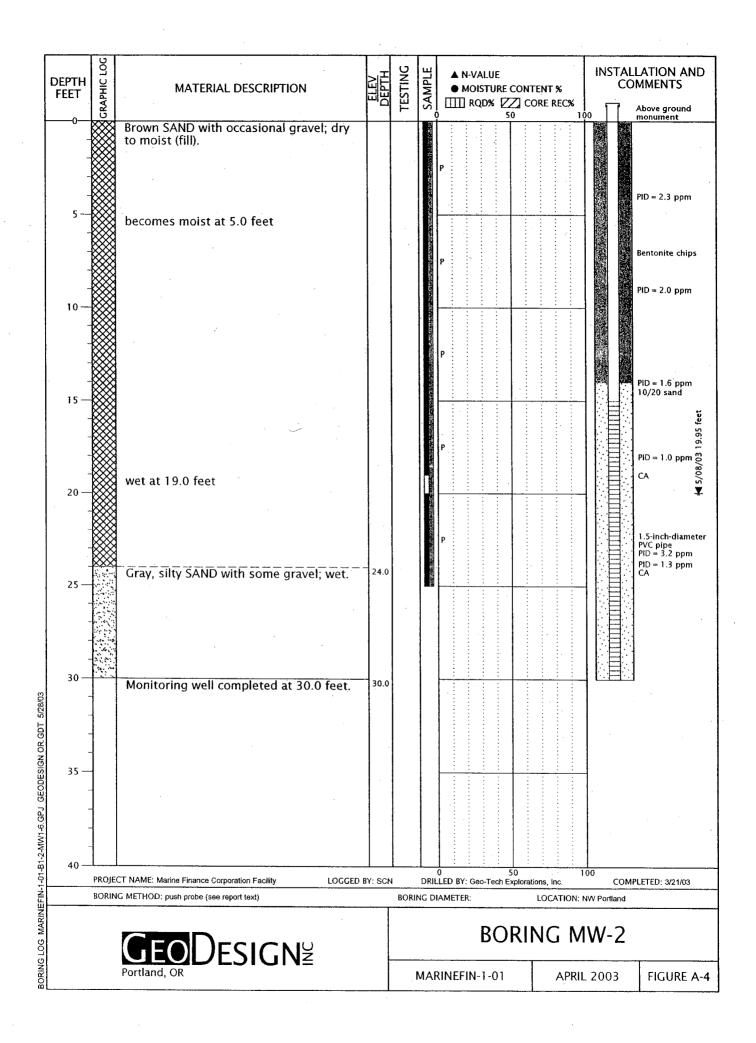
SYMBOL	SOIL DESCRIPTION		
	Location of sample obtained in general acco Test with recovery	rdance with	ASTM D 1586 Standard Penetration
	Location of sample obtained using thin wall, accordance with ASTM D 1587 with recovery	shelby tub ′	e, or Geoprobe® sampler in general
	Location of sample obtained using Dames & with recovery	Moore sam	pler and 300-pound hammer or pushe
M	Location of grab sample		
2	Rock coring interval		
$\underline{\nabla}$	Water level during drilling		
▼	Water level taken on date shown		
GEOTECHN	NICAL TESTING EXPLANATIONS		
PP	Pocket Penetrometer	SIEV	Sieve Gradation
TOR	Torvane	DD	Dry Density
CON	Consolidation	ATT	Atterberg Limits
DS	Direct Shear	CBR	California Bearing Ratio
P200	Percent Passing U.S. Standard No. 200 Sieve	OC	Organic Content
HYD	Hydrometer Gradation	P	Pushed Sample
NVIRONM	IENTAL TESTING EXPLANATIONS		
CA	Sample Submitted for Chemical Analysis	ND	Not Detected
PID	Photoionization Detector Headspace	NS	No Visible Sheen
nam	Analysis Parts Par Million	SS	Slight Sheen
ppm P	Parts Per Million	MS	Moderate Sheen
r	Pushed Sample	HS	Heavy Sheen
	EODESIGNE		Y TO TEST PIT AND RING LOG SYMBOLS
			TABLE A

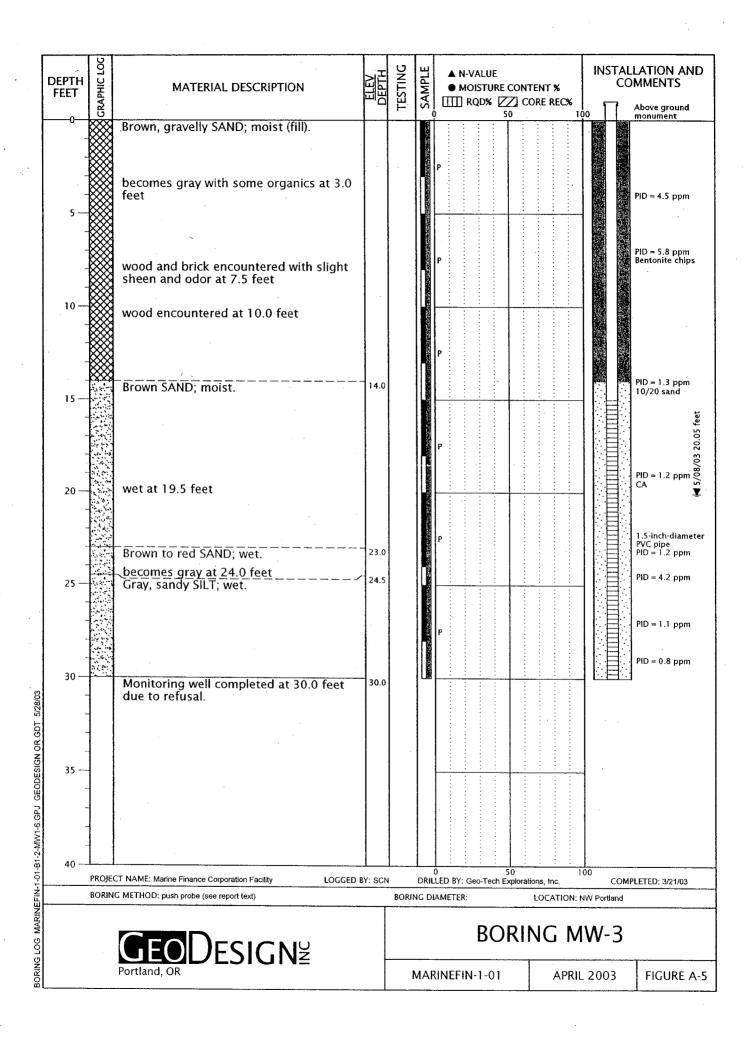
CONSISTANCY - CO.	ARSE-GRAINED SOILS	CONSIS	STANCY - FINE-GRAIN	IED SOILS
Relative Density	Standard Penetration Resistance	Consistency	Standard Penetration Resistance	Unconfined Compressive Strength (tsf)
Very Loose	0 - 4	Very Soft	Less than 2	Less than 0.25
Loose	4 - 10	Soft	2 - 4	0.25 - 0.50
Medium Dense	10 - 30	Medium Stiff	4 - 8	0.50 - 1.0
Dense	30 - 50	Stiff	8 - 15	1.0 - 2.0
Very Dense	More than 50	Very Stiff	15 - 30	2.0 - 4.0
		Hard	More than 30	More than 4.0
SOIL CLASSIFICATION	N NAME			
Na Na	me and Modifier Term	is .	Constituen	t Percentage
	GRAVEL, SAND		· · · · · · · · · · · · · · · · · · ·	50%
	sandy, gravelly		30	- 50%
	silty, clayey	1	15	- 50%
Coarse-grained	some (gravel, sand)		15	- 30%
	some (silt, clay)		F	1 50/
	trace (gravel, sand)		J ,	15%
	trace (silt, clay)		·	:5%
	CLAY, SILT		>	50%
	silty, clayey		20	F/00/
	sandy, gravelly		7 30	- 50%
Fine-grained	some (sand, gravel)		15	3.00/
	some (silt, clay)] 13	- 30%
	trace (sand, gravel)			1 00/
	trace (silt, clay)		J 3.	15%
	PEAT		50 -	100%
Organic	organic (soil name)		15	- 50%
	(soil name) with some	e organics	5 -	15%
MOISTURE CLASSIF	ICATION			
To	erm		Field Test	· · · · · · · · · · · · · · · · · · ·
	<u>lry</u>	very low moisture,		
m	oist	damp, without visi	ble moisture	
V	vet	visible free water, ı	usually saturated	
GRAIN SIZE CLASSIF	ICATION			•
Desc	ription	Sieve*		Observed Size
boı	ılders	-		>12"
col	obles	_		3"-12"
graval	coarse	0.75"-3'	,	0.75"-3"
gravel	fine	#4 - 0.75		0.19" - 0.75"
	coarse	#10 - #4		0.079" - 0.19"
sand	medium	#40 - #1		0.017" - 0.079"
	fine	#200 - #4		0029" - 0.017"
fi	nes	<#200		<0.0029"
* Use of #200 field s	ieve encouraged			
		SOIL	CLASSIFICATION	ICVCTERA
)ESIGN≌	JOIL !	AND GUIDELIN	

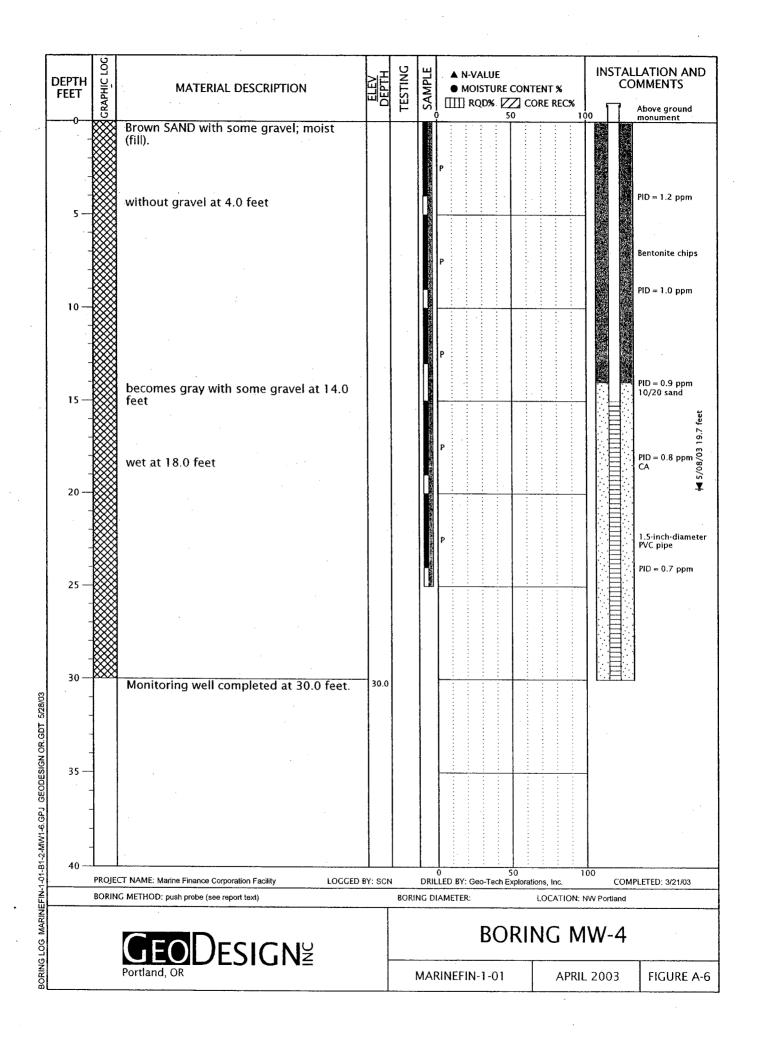


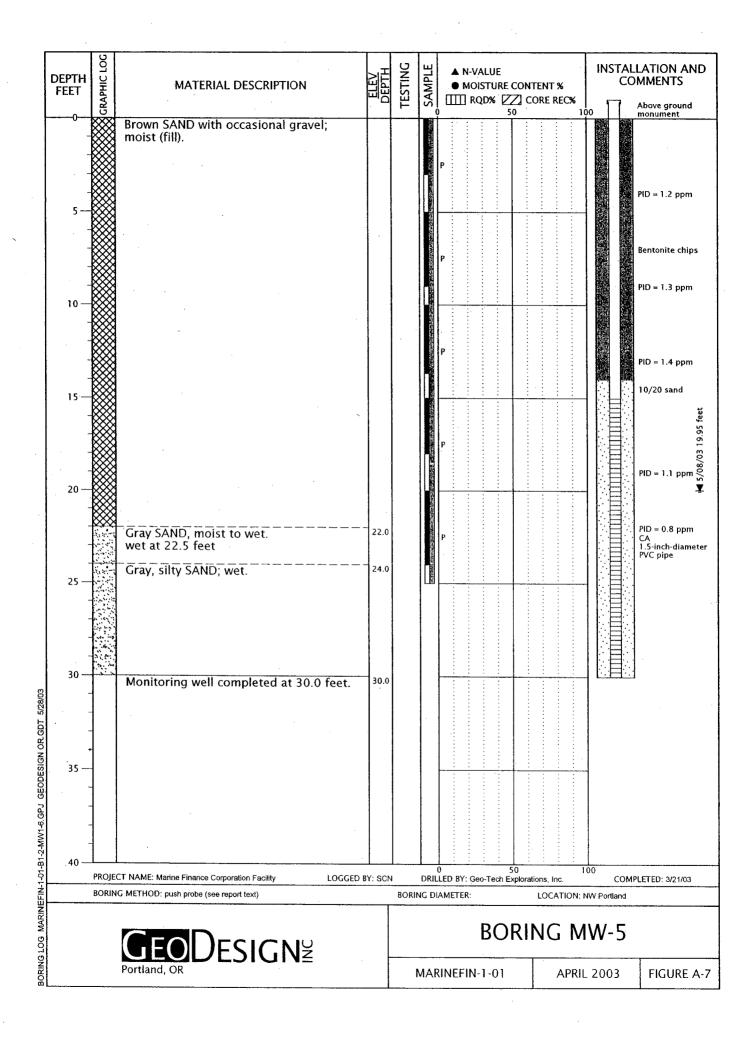


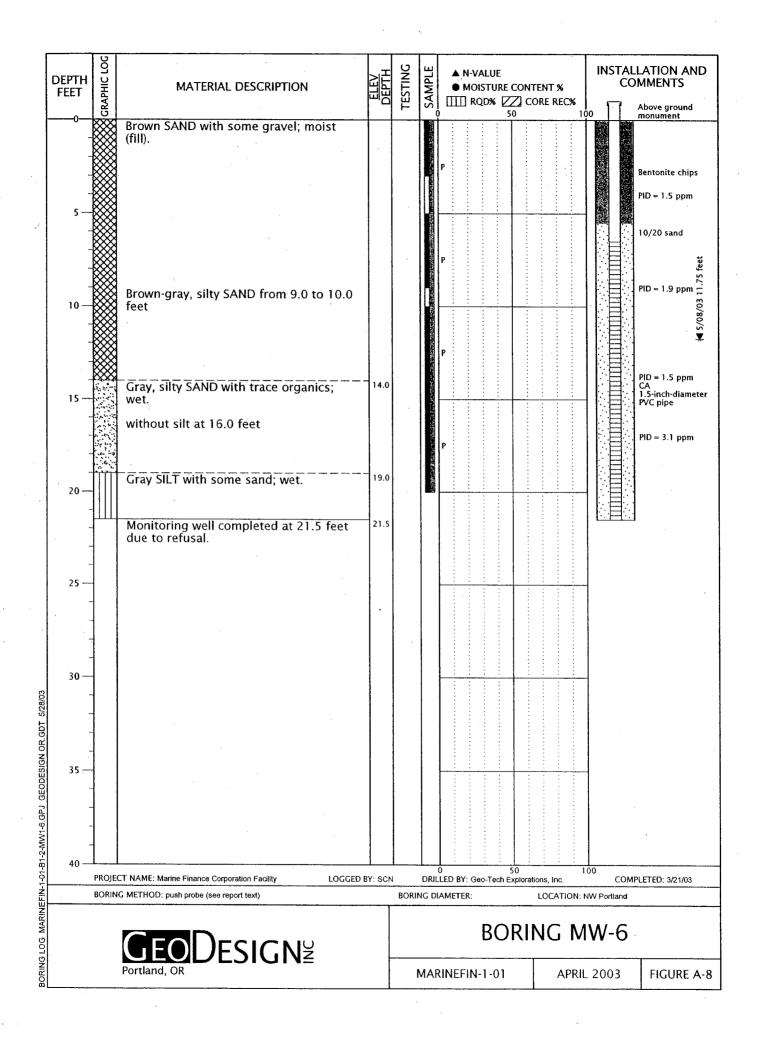












APPENDIX B

CHEMICAL ANALYTICAL PROGRAM

Chain-of-custody procedures were followed during handling and transport of the soil samples to the analytical laboratory. The laboratory holds the samples in cold storage pending extraction and/or analysis. The analytical results, analytical methods reference and laboratory quality control records are included in this appendix. The analytical results also are summarized in the tables of this report.

REVIEW OF ANALYTICAL DATA

GeoDesign maintains an internal quality assurance (QA) program, consisting of the following field procedures:

Trip Blanks - Trip Blanks are laboratory prepared water samples that are free of contaminants. The blanks are carried through the sample collection process along with the field samples to document that contaminants were not introduced to the samples during sample handling and analysis.

Equipment Rinsate Blanks - Equipment Rinsate Blanks are water samples that are obtained by collecting contaminant-free water as it is being poured over decontaminated field equipment. The blanks are analyzed to ensure that proper decontamination procedures were followed in the field.

Duplicates - Duplicates are obtained by collecting a second set of water samples from one water source. The duplicates are submitted to the laboratory anonymously for analysis. The analytical results are then compared by calculating the relative percent difference between the samples.

In addition, the analytical laboratory maintains an internal QA program, consisting of a combination of the following:

Blanks - Blanks are laboratory prepared water samples that are free of contaminants. The blanks are carried through the analysis procedure along with the field samples to document that contaminants were not introduced to the samples during sample handling and analysis.

Surrogate Recoveries - Surrogates are organic compounds that are similar in nature to the analytes of concern but are not normally found in nature. The surrogates are added to quality control and field samples prior to analysis. The percent recovery of the surrogate is calculated to demonstrate acceptable method performance.

Duplicates - Duplicates are obtained by splitting a sample into two parts. The two separate parts are carried through the analyses. The analytical results are then compared by calculating the relative percent difference between the samples.



Matrix Spike and Matrix Spike Duplicate (MS/MSD) Recoveries - An MS sample is a sample that has been split into a second portion. The MSD is obtained by further splitting the MS sample. A known concentration of the analyte of interest is added to the MS and MSD samples. The analytical results for both samples are then compared for relative percent difference and percent recovery to demonstrate acceptable method performance.

Blank Spike and Blank Spike Duplicate (BS/BSD) Recoveries - BS and BSD samples are obtained and analyzed in the same procedure as the MS/MSD samples. However, the laboratory blank sample is used to obtain the BS/BSD samples. The percent recovery and relative percent difference of the known concentration of analyte of interest added to the BS/BSD sample is calculated after chemical analyses to demonstrate acceptable method performance.

SUMMARY OF ANALYTICAL DATA REVIEW

GeoDesign reviewed the attached analytical data report for data quality exceptions and deviations from acceptable method performance criteria. Based on our review, the analytical data are acceptable for their intended use.





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Anchorage 3209 Denali Street, Anchorage, AK 99503 907.334.9200 fax 907.334.9210

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IAPR 21 2003

GEODESIGN, INC.

18 April, 2003

Paul Trone GeoDesign 14945 SW Sequoia Parkway, Suite 170 Portland, OR 97224

RE: MarineFin-1-01

Enclosed are the results of analyses for samples received by the laboratory on 03/25/03 15:35. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Philip Nerenberg

Laboratory Manager

Work Orders included in this report:

P3C0737

North Creek Analytical, Inc. **Environmental Laboratory Network**



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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

3209 Denail Street, Anchorage, AK 99503

907.334.9200 fax 907.334.9210.

04/18/03 12:13

Reported:

Project Manager: Paul Trone

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-1 (8-10)	P3C0737-01	Soil	03/24/03 12:00	03/25/03 15:35
B-2 (7-9)	P3C0737-02	Soil	03/24/03 12:00	03/25/03 15:35
B-1 (17-18)	P3C0737-03	Soil	03/24/03 12:00	03/25/03 15:35
MW-1 (8-9)	P3C0737-04	Soil	03/21/03 12:00	03/25/03 15:35
MW-2 (18-20)	P3C0737-05	Soil	03/21/03 12:00	03/25/03 15:35
MW-2 (23-25)	P3C0737-06	Soil	03/21/03 12:00	03/25/03 15:35
MW-3 (19-20)	P3C0737-07	Soil	03/21/03 12:00	03/25/03 15:35
MW-4 (18-19)	P3C0737-08	Soil	03/21/03 12:00	03/25/03 15:35
MW-5 (22-23)	P3C0737-09	Soil	03/21/03 12:00	03/25/03 15:35
MW-6 (13-15)	P3C0737-10	Soil	03/21/03 12:00	03/25/03 15:35
MW-1 (14-15)	P3C0737-11	Soil	03/21/03 12:00	03/25/03 15:35

North Creek Analytical - Portland

Philip Neronberg

Philip Nerenberg, Laboratory Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Number: na

Project Manager: Paul Trone

Reported:

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Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
B-1 (8-10) (P3C0737-01RE1) Soil				<u>-</u>	Sampled: 03/2	4/03 Rece	ived: 03/25/	03	
Diesel Range Organics	ND	25.0	mg/kg dry	. 1	NWTPH-Dx	03/31/03	04/03/03	3030967	D-13
Heavy Oil Range Hydrocarbons	ND	50.0	" .	"	11	11	"	н .	D-13
Surr: 1-Chlorooctadecane	96.7 %	50-150							
B-2 (7-9) (P3C0737-02) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/	03	
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	03/31/03	3030967	
Heavy Oil Range Hydrocarbons	ND	50.0	"	4	11 11 11 11 11 11 11 11 11 11 11 11 11	03/31/03	11	11	
Surr: 1-Chlorooctadecane	92.7 %	50-150			-				
B-1 (17-18) (P3C0737-03) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/	03	
Diesel Range Organics	ND	25.0	mg/kg dry	-1	NWTPH-Dx	03/31/03	03/31/03	3030967	
Heavy Oil Range Hydrocarbons	ND	50.0	"	**	"	ir	u u	u	
Surr: 1-Chlorooctadecane	95.3 %	50-150							. ,
MW-1 (8-9) (P3C0737-04RE1) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	04/03/03	3030967	D-13
Heavy Oil Range Hydrocarbons	57.6	50.0	11	и	**	**	н	н	D-13
Surr: 1-Chlorooctadecane	101 %	50-150							
MW-2 (18-20) (P3C0737-05) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	03/31/03	3030967	-
Heavy Oil Range Hydrocarbons	ND	50.0		11	14	"	"	" >	
Surr: 1-Chlorooctadecane	93.1 %	50-150							
MW-2 (23-25) (P3C0737-06RE1) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	′03	
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	04/03/03	3030967	D-13
Heavy Oil Range Hydrocarbons	ND	50.0	+1	11	n	н	н	11	D-13
Surr: 1-Chlorooctadecane	98.4 %	50-150							

North Creek Analytical - Portland

Philip Neverberg

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chorage 3209 Denali Street, Anchorage, A

GeoDesign 14945 SW Sequoia Parkway, Suite 170 Project: MarineFin-1-01
Project Number: na

907.334.9200 fax 907.334.9210

Portland, OR 97224

Project Manager: Paul Trone

Reported:

04/18/03 12:13

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-4 (18-19) (P3C0737-08RE1) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Diesel Range Organics	31.0	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	04/03/03	3030967	D-13
Heavy Oil Range Hydrocarbons	66.1	50.0	11	11	"	н	ıı .	"	D-13
Surr: 1-Chlorooctadecane	111 %	50-150							
MW-1 (14-15) (P3C0737-11) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	03/31/03	3030967	
Heavy Oil Range Hydrocarbons	ND	50.0	11	**	"	H	"	et	
Surr: 1-Chlorooctadecane	84.3 %	50-150							

North Creek Analytical - Portland

Philip Nerenberg, Laboratory Manager

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Project: MarineFin-1-01 907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Project Number: na

Reported:

04/18/03 12:13

Total Metals per EPA 6000/7000 Series Methods North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
B-1 (8-10) (P3C0737-01) Soil		· ·		(Sampled: 03/2	4/03 Rece	ived: 03/25/0	03	
Antimony	ND	0.500	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	. ,
Arsenic	2.42	0.370	" _	11	**	03/26/03	03/27/03	3030870	
Beryllium	0.376	0.370	**	17	. #		n	tt	
Cadmium	ND	0.370	**	19	"	*	04/02/03	**	
Chromium	13.2	0.370	"	11	**	Ħ	03/27/03	"	
Copper	15.9	1.48	Ħ	11	н .	. 11	**	и	
Lead	4.73	0.370	, "	11	**	**	04/02/03	**	
Mercury	ND	0.100	**	п	EPA 7471A	03/31/03	03/31/03	3031013	
Nickel	17.9	0.741	11	н	EPA 6020	03/26/03	03/27/03	3030870	
Selenium	ND	0.370	n	**	n	#	#1		
Silver	ND	0.500	"	Ħ	er	04/02/03	04/04/03	3040095	
Thallium	ND	0.500	Ħ	11	**	. 11	04/03/03	'n	
Zinc	62.8	1.48	н .	"	H	03/26/03	03/27/03	3030870	
B-2 (7-9) (P3C0737-02) Soil	-				Sampled: 03/2	4/03 Rece	ived: 03/25/	03	
Antimony	8.99	0.355	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
Arsenic	2.27	0.305	"	#	, u	03/26/03	03/27/03	3030870	
Beryllium	0.375	0.305	**	**	æ	Ħ	. н	"	
Cadmium	5.39	0.305	11	**	u	11	**	"	
Chromium	16.4	0.305	"	"		н	**	11	,
Copper	17.1	1.22	n	н	**	* 11	н .	11	•
Lead	5.82	0.305	n	н	#	If	04/02/03	u	
Mercury	ND	0.0893	"	*	EPA 7471A	03/31/03	03/31/03	3031013	
Nickel	18.5	0.610	11	**	EPA 6020	03/26/03	03/27/03	3030870	
Selenium	ND	0.305	#	**	"	**	**	"	
Silver	ND	0.355		**	**	04/02/03	04/04/03	3040095	
Thallium	ND	0.355		**	. "	н '	04/03/03	H	
Zinc	92.4	1.22	n	n	. "	03/26/03	03/27/03	3030870	

North Creek Analytical - Portland

Philip Nevenberg

Philip Nerenberg, Laboratory Manager

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GeoDesign

Project Number: na

3209 Denali Street, Anchorage, Al-907.334.9200 fax 907.334.9210

Portland, OR 97224

rioject Number. Ha

Reported:

Project Manager: Paul Trone

04/18/03 12:13

Total Metals per EPA 6000/7000 Series Methods North Creek Analytical - Portland

Project: MarineFin-1-01

Analyte Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (8-9) (P3C0737-04) Soil				Sampled: 03/2	1/03 Recei	ved: 03/25/0)3	
Antimony ND	0.500	mg/kg dry	i	EPA 6020	04/02/03	04/04/03	3040095	
Arsenic 1.66	0.321	**	**	**	03/26/03	03/27/03	3030870	
Beryllium 0.742	0.321	**	**	**	"	**	"	
Cadmium ND	1.95	11	6.08	11	Ħ	04/02/03	**	R-03
Chromium 22.9	0.321	**	1	11	**	03/27/03	**	
Copper 18.3	1.28		Ħ	"	tt.	**	**	
Lead 10.5	0.321	11	**	. "	H	04/02/03	H .	
Mercury	0.100	н	Ħ	EPA 7471A	03/31/03	03/31/03	3031013	
Nickel 13.6	0.641	н	**	EPA 6020	03/26/03	03/27/03	3030870	
Selenium ND	0.321	. "	"	**	**	Ħ		
Silver	0.500	**	".	**	04/02/03	04/04/03	3040095	
Thallium ND	0.500	**	Ħ	tr	. 41	04/03/03	in	
Zinc 55.8	1.28	11	**	"	03/26/03	03/27/03	3030870	
MW-2 (18-20) (P3C0737-05) Soil			;	Sampled: 03/2	1/03 Rece	ived: 03/25/	03	٠
Antimony ND	0.309	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
Arsenic 2.31	0.431	#1	**	"	03/26/03	03/27/03	3030870	
Beryllium ND	0.431	"	**		н	**	H	
Cadmium ND	0.431	11	11	**	**	н	"	
Chromium 14.2	0.431	a	n	**	"	tt	**	
Copper 35.7	1.72	н	н	"	"	**	11	
Lead 4.04	0.431	Ħ	#1	•	**	04/02/03	**	
Mercury	0.0862	#1	91	EPA 7471A	03/31/03	03/31/03	3031013	
Nickel 16.9	0.862	11	**	EPA 6020	03/26/03	03/27/03	3030870	
Selenium ND	0.431	tt	**	!! ,	· n	11	**	
Silver	0.309		**	**	04/02/03	04/04/03	3040095	
Thallium ND	0.309	**	**	11	*1	04/03/03	*1	
Zinc 63.6	1.72	11	11	н	03/26/03	03/27/03	3030870	

North Creek Analytical - Portland

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Philip Nerenberg, Laboratory Manager

Philip Nevenberg

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

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Project: MarineFin-1-01

Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-3 (19-20) (P3C0737-07) Soil					Sampled: 03/2	1/03 Recei	ived: 03/25/0	03	
Antimony	ND	0.329	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
Arsenic	2.91	0.397	н	er er	**	03/26/03	03/27/03	3030870	
Beryllium	ND	0.397	**	**	"	11	н	. "	
Cadmium	ND	0.397	"	**	11	11	(I	10	
Chromium	13.2	0.397	**	**	Ħ	11	("	**	
Copper	16.8	1.59	e	**	# .	н	**	#	
Lead	2.24	0.397	H	**	**		04/02/03	**	
Mercury	ND	0.0893	**	"	EPA 7471A	03/31/03	03/31/03	3031013	
Nickel	17.0	0.794	**	"	EPA 6020	03/26/03	03/27/03	3030870	*
Selenium	ND	0.397	11	**	11	**		11	
Silver	ND	0.329	tt .	"	Ħ ,	04/02/03	04/04/03	3040095	
Thallium	ND	0.329	17	н .	Ħ	"	04/03/03	"	
Zinc	51.0	1.59	"		H	03/26/03	03/27/03	3030870	
MW-4 (18-19) (P3C0737-08) Soil				•	Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Antimony	ND	0.350	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	······································
Arsenic	2.67	0.286	"	**	11 A 0020	03/26/03	03/27/03	3030870	
Beryllium	0.298	0.286	"	#	#1	03/20/03 #	# #	3030870	
Cadmium	ND	0.286	,	n	**	. #		11	
Chromium	11.3	0.286	n		**	11	**	ar.	
Copper	17.5	1.14	n	11 .	•	**		14	
Lead	7.78	0.286	**	11	n	11	04/02/03	11	
Mercury	0.182	0.0862	**	**	EPA 7471A	03/31/03	03/31/03	3031013	
Nickel	15.7	0.571	er	11	EPA 6020	03/26/03	03/27/03	3031013	
Selenium	ND	0.286	n	**	U 17 0020	#	U3/2//U3	11	
Silver	ND	0.350	Ħ	н	**	04/02/03	04/04/03	3040095	
Thallium	ND	0.350	**	. "	**	"	04/03/03	3040033 H	
Zinc	52.8	1.14	tr .	11	н	03/26/03	03/27/03	3030870	

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Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Number: na

Portland, OR 97224

GeoDesign

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-5 (22-23) (P3C0737-09) Soil					Sampled: 03/2	1/03 Recei	ived: 03/25/0	03.	
Antimony	ND	0.397	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
Arsenic	1.76	0.394	U	ŧı	11	03/26/03	03/27/03	3030870	
Beryllium	ND	0.394	tt	11	11	tt	" "	**	
Cadmium	ND	0.394	11	н ,	**	"	"	**	
Chromium	19.2	0.394	**		,,	. 11	**	••	
Copper	20.0	1.57	19	н .		"	**	11	
Lead	5.92	0.394	н	11	11	11	04/02/03	"	i.
Mercury	ND	0.100	н	**	EPA 7471A	03/31/03	03/31/03	3031013	
Nickel	23.4	0.787	ur .	**	EPA 6020	03/26/03	03/27/03	3030870	
Selenium	ND	0.394	. "	"	**	,m		**	
Silver	ND	0.397	**	u	11	04/02/03	04/04/03	3040095	
Thallium	ND	0.397	н	11	11	11	04/03/03	ń	
Zinc	58.2	1.57	н.	# .	tt	03/26/03	03/27/03	3030870	
MW-6 (13-15) (P3C0737-10) Soil					Sampled: 03/2	1/02 Page	ived: 03/25/	03	
Antimony	ND	0.329	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
Arsenic	1.97	0.413	**	**	**	03/26/03	03/27/03	3030870	
Beryllium	ND	0.413	**	**	**	н	"	**	
Cadmium	ND	0.413	**	**	**	**	**	H	
Chromium	15.9	0.413	\$1	#1	11	"	"	н	
Copper	18.6	1.65	11	**	. "	**	"	"	
Lead	11.1	0.413	11	11	**	н	04/02/03	н	
Mercury	ND	0.0862	**	**	EPA 7471A	03/31/03	03/31/03	3031013	
Nickel	21.3	0.826	н	*	EPA 6020	03/26/03	03/27/03	3030870	
Selenium	ND	0.413	. 11	**	"	"		# ,	
Silver	ND	0.329	. 11	11	**	04/02/03	04/04/03	3040095	
Thallium	ND	0.329	н	**	**	"	04/03/03	н	
Zinc	52.8	1.65	. •	#1	н	03/26/03	03/27/03	3030870	

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Project: MarineFin-1-01

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Project Number: na

Reported:

Project Manager: Paul Trone

04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
B-2 (7-9) (P3C0737-02) Soil				S	Sampled: 03/2	4/03 Recei	ived: 03/25/	03	
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
Benzene	ND	100	**	**	**	**	14	**	
Bromobenzene	ND	100	. "	**	**	н	If	**	
Bromochloromethane	ND	100	"	"	11	**	н	H	
Bromodichloromethane	ND	100	"	11	11	. "	**	ź "	
Bromoform	ND	100	11	**	11	. 11	н		
Bromomethane	ND	500	н	Ħ	17	11		**	
2-Butanone	ND	1000	"	H	11	**	**	**	
n-Butylbenzene	ND	500	n ·	rr ·	11	"	11	н	
sec-Butylbenzene	ND	100	"	11	**	н	11	**	
tert-Butylbenzene	ND	100	Ħ	"	"	н	je !	**	
Carbon disulfide	ND	1000	**	**	"	11	**	. "	
Carbon tetrachloride	ND	100	. 11	11	**	11	••	11	
Chlorobenzene	ND	100	**	n .	u	**	**	11	
Chloroethane	ND	100	#	"	"	· tt	**	11	
Chloroform	ND	100		"	**	et	**	**	
Chloromethane	ND ·	500	n	**	**	**	11	и	
2-Chlorotoluene	266	100	"	"	**	**	**	n	
4-Chlorotoluene	ND	100	**	11	11	11	"	**	
1,2-Dibromo-3-chloropropane	ND	500	"	Ħ	11	11	"	**	
Dibromochloromethane	ND	100	11	**	**	11	**	**	
1,2-Dibromoethane	ND	100	Ħ		11	н	. "	11	
Dibromomethane	ND	100	**		**	11	**	**	
1,2-Dichlorobenzene	ND	100	#	**	"	**	**		
1,3-Dichlorobenzene	ND	100	11	#	•	**	**	. #	
1,4-Dichlorobenzene	ND	100	**	*	"		**	н	
Dichlorodifluoromethane	ND	500	**	**		**	**	**	
1,1-Dichloroethane	ND	100	**	н	"	**	**	**	
1,2-Dichloroethane	ND	100	**	11	n	**	n	"	
1,1-Dichloroethene	ND	100	н	"	**	**	"	"	
cis-1,2-Dichloroethene	ND	100	**	**	**	"	11	**	
trans-1,2-Dichloroethene	ND	100	41	11	**	11	i	**	
1,2-Dichloropropane	ND	100	11	"	11	, "	"		•
1,3-Dichloropropane	ND	100	n	**	ti	. "	**	11	
2,2-Dichloropropane	ND	100	**	**	**	н	tt.	ч	
1,1-Dichloropropene	ND	100	**	и	**	11	**	11	
cis-1,3-Dichloropropene	ND	100	**	"	11	11	11	"	
trans-1,3-Dichloropropene	ND	100	"	**	**	**	14	"	
Ethylbenzene	ND	100	**	"	"	"	**	Ħ	

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported:

04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Note
B-2 (7-9) (P3C0737-02) Soil					Sampled: 03/24	4/03 Rece	ived: 03/25/	03	
Hexachlorobutadiene	ND	200	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
2-Hexanone	ND	1000	16	11	11	11	"		
Isopropylbenzene	ND	200	11	**	11	. #	"	**	
p-Isopropyltoluene	ND	200	u	**	н ,	**	Ħ	**	
4-Methyl-2-pentanone	ND	500	er e	"	и.	11	н	"	
Methyl tert-butyl ether	ND	100	н	н	, n	**	tt	ų	
Methylene chloride	· ND	500	Ħ	Ħ	**	**	11	#	
Naphthalene	ND	200	**	"		**	**	**	
n-Propylbenzene	ND	100	* **	"	11	11	**	#1	
Styrene	ND	100	**	tt	н .	tt	11	. #	
1,1,1,2-Tetrachloroethane	ND	100	11	**	11	# .	11	**	
1,1,2,2-Tetrachloroethane	ND	100	. 11	**	11	Ħ	**	**	
Tetrachloroethene	ND	100	ti	H		Ħ	, 11	Ħ	1
Toluene	ND	100	н	**	н	н	#	11	
1,2,3-Trichlorobenzene	ND	100	**	11	н.,	şı	#	**	
1,2,4-Trichlorobenzene	ND	100	"	Ħ	**	11	Ħ	10	
1,1,1-Trichloroethane	ND	100	#	**	11	•	Ħ	19	
1,1,2-Trichloroethane	ND	100		н	11		*!	**	
Trichloroethene	ND	100	**	н	#	*	**	**	
Trichlorofluoromethane	ND	100	**	#1	**	**	н	**	
1,2,3-Trichloropropane	ND	100	**	tt	**	tt	Ħ	"	
1,2,4-Trimethylbenzene	ND	100	**		11	11			
1,3,5-Trimethylbenzene	ND	100	**		**	н	**	**	
Vinyl chloride	ND	100	11	**	#1	**	"	**	
o-Xylene	ND	100	"	**	**	u.	Ħ	*	
m,p-Xylene	ND	200	**	"	H	**	**	"	*
Surr: 4-BFB	82.4 %	65.4-143					·		
Surr: 1,2-DCA-d4	96.6 %	77.7-144							
Surr: Dibromofluoromethane	86.6 %	66.5-131	4						*
Surr: Toluene-d8	89.3 %	77.5-143							

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Philip Nerenberg, Laboratory Manager



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Portland, OR 97224

Project Number: na

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (18-20) (P3C0737-05) Soil					Sampled: 03/2	1/03 Recei	ived: 03/25/	03	
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
Benzene	ND	100	, H	11		111	**	#	
Bromobenzene	ND	100	**	11	т н	11	11	**	
Bromochloromethane	ND	100	и	**	**	. 11	н	\$f	
Bromodichloromethane	ND	100	11	**	#		**		
Bromoform	ND	100	Ħ	11	**	"	11	**	
Bromomethane	ND	500	11	Ħ	**	"	**	**	
2-Butanone	ND	1000	-11	Ħ	**	"	Ħ		
n-Butylbenzene	ND	500	n	11 '	**	**	11	н	
sec-Butylbenzene	ND	100	"	ti	. "	11	н		
tert-Butylbenzene	ND	100	**	"		11	tr		
Carbon disulfide	ND	1000	"	**		ti .	**	`**	
Carbon tetrachloride	ND	100	"	**	**	. н	**	•	
Chlorobenzene	ND	100	#	#1	· "	Ħ	18	**	
Chloroethane	ND	100	**	11	*1		**	**	
Chloroform	ND	100	11	11	11	"	**	"	*
Chloromethane	ND	500	11	"	an an	tt	**	"	
2-Chlorotoluene	ND	100	*	**	н	11	**	**	
4-Chlorotoluene	ND	100	*1	**	н	11	u	**	
1,2-Dibromo-3-chloropropane	ND	500	**	**	н	11		н .	
Dibromochloromethane	ND	100		"	н	н	п	"	
1,2-Dibromoethane	ND	100	**	**	**	Ħ	11	Ħ	
Dibromomethane	ND	100	**	11	••	tt	**		
1,2-Dichlorobenzene	ND	100	**	**	**	**	"		
1,3-Dichlorobenzene	ND	100	Ħ	**	н	•		**	
1,4-Dichlorobenzene	ND	100	*	-#1	н	**	11	**	
Dichlorodifluoromethane	ND	500	**		**	"	н	**	
1,1-Dichloroethane	ND	100	"	R	**	**	**		
1,2-Dichloroethane	ND	100	**	11	**	**	**	#	
1,1-Dichloroethene	ND	100	ti	#	et	**	91	**	
cis-1,2-Dichloroethene	ND	100	#1	н	**	**	11	n	
trans-1,2-Dichloroethene	ND	100	**	**	**	41	11	**	
1,2-Dichloropropane	ND	100	11	11	**	**	Ħ	n	
1,3-Dichloropropane	ND	100		11	**	**	11	**	
2,2-Dichloropropane	ND	100	u	н	n	**	**	н	
1,1-Dichloropropene	ND	100	ii.	"	er .	· · · · · · · · · · · · · · · · · · ·	ii	**	
cis-1,3-Dichloropropene	ND	100	#	**	•	н	н	Ħ	
trans-1,3-Dichloropropene	ND	100	H	**		11	"	п	
Ethylbenzene	ND	100	**	11	"	**	#	#	

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GeoDesign 14945 SW Sequoia Parkway, Suite 170 Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Number: na

Portland, OR 97224

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (18-20) (P3C0737-05) Soil			,		Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Hexachlorobutadiene	ND	200	ug/kg dry	. 1	EPA 8260B	03/25/03	03/29/03	3030797	
2-Hexanone	ND	1000	н	' н	11	**	**	**	
Isopropylbenzene	ND	200	11	Ħ	11	n .	. "	11	
] p-Isopropyltoluene	ND	200	н	10	н	11	"	11	
4-Methyl-2-pentanone	ND	500	Ħ	11	11	u	u	и .	
Methyl tert-butyl ether	ND	100	. 11	н	"	11		н	
Methylene chloride	ŅD	500	**	U		"	**	, n	
Naphthalene	ND	200	**	. #	**		ıı	"	
n-Propylbenzene	ND	100	н	н	**	"	**	**	
Styrene	ND	100	("	**	п	. 11	"	11	
1,1,1,2-Tetrachloroethane	ND	100	11	H	16		u	u	
1,1,2,2-Tetrachloroethane	ND	100	п	11	n .		н	'n	
Tetrachloroethene	ND	100	11	# .	**	н	II	n	
Toluene	ND	100	"	**	**	u	n	It	
1,2,3-Trichlorobenzene	ND	100	"	#	**	"	11	11	
1,2,4-Trichlorobenzene	ND	100	"	Ħ	#		**	**	
1,1,1-Trichloroethane	ND	100	**	#	**	**	#	**	
1,1,2-Trichloroethane	ND	100	**	"	. "	"	11	**	•
Trichloroethene	ND	100	.**	11	н	н	"	11	
Trichlorofluoromethane	ND	100	**	# .	11	н		H	
1,2,3-Trichloropropane	ND	100	Ħ	**	"	**	**	H	-
1,2,4-Trimethylbenzene	ND	100	**	"	11	**	11	**	
1,3,5-Trimethylbenzene	ND	100	**	**	n .	*	. 11	"	
Vinyl chloride	ND	100	"	**	"	11	#	H H	
o-Xylene	ND	100	**	**		**	"	ŧŧ	
m,p-Xylene	ND	200	. "	**	"			**	•
Surr: 4-BFB	87.4 %	65.4-143			<u> </u>				
Surr: 1,2-DCA-d4	99.6 %	77.7-144						-	
Surr: Dibromofluoromethane	88.2 %	66.5-131							
Surr: Toluene-d8	93.1 %	77.5-143							

North Creek Analytical - Portland

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Number: na

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-6 (13-15) (P3C0737-10) Soil					Sampled: 03/2	1/03 Recei	ived: 03/25/	03	
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
Benzene	ND	100	**	"	**		11	н .	
Bromobenzene	ND	100	**	11	**	11	**	н	
Bromochloromethane	ND	100	, tr	# .	"	"	. "	Ħ	
Bromodichloromethane	ND	100		"	**	**	. "	ri .	
Bromoform	ND	100	11	**	"	10		. "	
Bromomethane	ND	500	**	**	"	**	#	H	
2-Butanone	ND	1000		"	**	н	**	**	
n-Butylbenzene	ND	500	u	**	"	**	**	**	
sec-Butylbenzene	ND	100	II	11	"		**	**	
tert-Butylbenzene	ND	100	" .	**	#	*			
Carbon disulfide	ND	1000	. **	11	# .	"		'n	
Carbon tetrachloride	ND	100	11	11	**	**	"	H	
Chlorobenzene	ND	100	11	**	"	н .	ч	'n	
Chloroethane	ND	100	11	н .	**	"	Ħ	"	
Chloroform	ND	100	н	**	**	**	н ,	"	
Chloromethane	ND	500	Ħ		. "	11	*1	۳.	
2-Chlorotoluene	ND	100	11	11	"	**	11	**	
4-Chlorotoluene	ND	100	11	. 11	11	Ħ	. 11	н	
1,2-Dibromo-3-chloropropane	ND	500	н	11	н		н,	#	
Dibromochloromethane	ND	100	**	n	**	**	**	11	
1,2-Dibromoethane	ND	100	**	**	"	, "	11	"	
Dibromomethane	ND	100	н	**	11	н	**	**	
1,2-Dichlorobenzene	ND	100	**	**	н		. "	Ħ	
1,3-Dichlorobenzene	ND	100	** .	**	н		**	**	
1,4-Dichlorobenzene	ND	100	**	**	Ħ	Ħ	n,	"	
Dichlorodifluoromethane	ND	500	11		11	н .	**	11	
1,1-Dichloroethane	ND	100	. 41	"	41	**	#1	**	
1,2-Dichloroethane	ND	100	н .	"	III	***	**	11	
1,1-Dichloroethene	ND	100	**	"	н	11	"	"	
cis-1,2-Dichloroethene	ND	100	e .	**	#	H	"	11	
trans-1,2-Dichloroethene	ND	100	#	**	#	#	11	#	
1,2-Dichloropropane	ND	100	#		31	11	· H	14	
1,3-Dichloropropane	ND	100	**	# .	н	11	Ħ	"	
2,2-Dichloropropane	ND	100	**		н	11	**	Ħ	
1,1-Dichloropropene	ND	100	"	**	11	11	11	π	
cis-1,3-Dichloropropene	ND	100	"	"	11	"	u	11	
trans-1,3-Dichloropropene	ND	100	н	**	n	н	11	11	
Ethylbenzene	ND	100	er	**		11	u	#	

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

3209 Denall Street, Anchorage, A 907.334.9200 fax 907.334.9210

Project Number: na

Project Manager: Paul Trone

Reported:

04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-6 (13-15) (P3C0737-10) Soil					Sampled: 03/21	1/03 Recei	ved: 03/25/	03	
Hexachlorobutadiene	ND	200	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
2-Hexanone	ND	1000	**	"		۳.	Ħ	11	
Isopropylbenzene	ND	200	**	11	**	"	"		
p-Isopropyltoluene	ND	200	**	11	"	" :	**	**	•
4-Methyl-2-pentanone	ND	500		n	II	"	**	tt	
Methyl tert-butyl ether	ND	100	11	. #	Ħ	"	. 10	**	
Methylene chloride	ND	500	:"	Ħ	If	**	. "	**	
Naphthalene	ND	200	11	**	"	"	"	**	
n-Propylbenzene	ND	100	**	**	"	tt.	н	**	
Styrene	ND	100	**	Ħ	Ħ	**	**	*1	
1,1,1,2-Tetrachloroethane	ND	100		**	#	**	**	н	
1,1,2,2-Tetrachloroethane	ND	100	**	#	u	H · ·	"	it	
Tetrachloroethene	ND	100	H	"	н	*		**	
Toluene	ND	100	**	Ħ	11	**	**	"	
1,2,3-Trichlorobenzene	ND	100	. "	**	# .	"	**	"	
1,2,4-Trichlorobenzene	ND	100	11	**	Ħ	"	**	- "	
1,1,1-Trichloroethane	ND	100	"	**	**	н	**	**	
1,1,2-Trichloroethane	ND	100	II .	**	"	"	11	"	
Trichloroethene	ND	100	**	11	**	**	n	"	
Trichlorofluoromethane	ND	100	**	Ħ		**	tt		
1,2,3-Trichloropropane	ND	100	**	ŧŧ	**	11	**	"	
1,2,4-Trimethylbenzene	ND	100	*1	**	"	н	"	**	
1,3,5-Trimethylbenzene	ND	100	Ħ	u	н	н	"	н	
Vinyl chloride	ND	100	**	"	"		**	11	
o-Xylene	ND	100		**	.#	н	н		
m,p-Xylene	ND	200	n	**	Ħ	"	**	"	
Surr: 4-BFB	88.1 %	65.4-143			, ,				
Surr: 1,2-DCA-d4	98.0 %	77.7-144							
Surr: Dibromofluoromethane	87.7 %	66.5-131							
Surr: Toluene-d8	92.5 %	77.5-143		u.					

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Philip Nerenberg, Laboratory Manager

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GeoDesign

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Project Number: na

907.334.9200 fax 907.334.9210

Portland, OR 97224

Project Manager: Paul Trone

Reported:

04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

Project: MarineFin-1-01

North Creek Analytical - Portland

Angleta	D14	Reporting	11	Direct	3.6-41 1			m . •	
Analyte	Result	Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
B-1 (8-10) (P3C0737-01) Soil				3	Sampled: 03/2	4/03 Rece	ived: 03/25/	03	R-05
Acenaphthene	45.3	26.8	ug/kg dry	2	EPA 8270m	04/03/03	04/07/03	3040110	
Acenaphthylene	ND	26.8	"	н	**	"	. #	н	
Anthracene	ND .	26.8	*	*	11	*	. 11	#	
Benzo (a) anthracene	104	26.8	"	. "	Ħ		11	11	
Benzo (a) pyrene	114	26.8	"	"	. "	#1	**	**	
Benzo (b) fluoranthene	72.8	26.8	11	"	11	11	. #	Ħ	
Benzo (ghi) perylene	91.6	26.8	н	"	н	11	**	"	
Benzo (k) fluoranthene	71.2	26.8	. 11	**	11	н .	H -	"	
Chrysene	139	26.8	Ħ	*	11	н	"	**	
Dibenzo (a,h) anthracene	ND	26.8	Ħ	"	77	11		**	
Fluoranthene	310	26.8	**	"		. H		**	
Fluorene	ND	26.8	. "	. "	Ħ	Ħ	**	i	
Indeno (1,2,3-cd) pyrene	66.9	26.8	н .	**	Ħ	Ħ,	**		
Naphthalene	ND	26.8	**	**	"	**	**	11	
Phenanthrene	144	26.8	. "	•	11	н	It	**	
Pyrene	327	26.8	"	"	"	Ħ	It	"	
Surr: Fluorene-d10	53.2 %	40-150							
Surr: Pyrene-d10	50.0 %	40-150							
Surr: Benzo (a) pyrene-d12	48.8 %	40-150							
B-2 (7-9) (P3C0737-02) Soil				5	Sampled: 03/2	4/03 Rece	ived: 03/25/	03	R-0:
Acenaphthene	ND	26.8	ug/kg dry	2	EPA 8270m	04/03/03	04/07/03	3040110	11-0.
Acenaphthylene	ND	26.8	" E' KE ULY	2 . H	EFA 62/0111	"	11	3040110	
Anthracene	ND	26.8	"	**	**		11	"	
Benzo (a) anthracene	111	26.8	11	11	, п	**	14	**	
Benzo (a) pyrene	138	26.8	41	n				"	
Benzo (b) fluoranthene	82.6	26.8	***	"	**	- "	. "	11	
Benzo (ghi) perylene	117	26.8	"	,,	#	**		11	
Benzo (k) fluoranthene	89.9	26.8		,,	44	11		11	
Chrysene	139	26.8	11	"	н	. "			
Dibenzo (a,h) anthracene	ND	26.8	. 11	н		**		H	
Fluoranthene	254	26.8	н	"	H		"	"	
Fluorene	ND	26.8		**	n	**	"		
Indeno (1,2,3-cd) pyrene	82.3	26.8				"	"		
Naphthalene	82.3 ND		"		**	"	"	"	
Phenanthrene		26.8	"	11	"	"	"	"	
	ND	26.8	"	"	"	"	"	11	
Driving									
Pyrene Surr: Fluorene-d10	293 42.8 %	26.8 40-150	<u> </u>						

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Philip Nerenberg, Laboratory Manager

Philip Nevenberg

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

907.334.9200 fax 907.334.9210

Reported:

Project Manager: Paul Trone

04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
B-2 (7-9) (P3C0737-02) Soil			· · · · · · · · · · · · · · · · · · ·		Sampled: 03/2	4/03 Rece	ived: 03/25/	03	R-05
Surr: Pyrene-d10	41.3 %	40-150					·		
Surr: Benzo (a) pyrene-d12	40.2 %	40-150							
B-1 (17-18) (P3C0737-03) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/	03	
Acenaphthene	ND	40.2	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	R-03
Acenaphthylene	ND	13.4	. "	H	11	**	H.	n	
Anthracene	ND	13.4	**	"		**	н	**	
Benzo (a) anthracene	20.4	13.4	"	"	•	H	*	. "	
Benzo (a) pyrene	17.1	13.4	11	**	11	**	**		
Benzo (b) fluoranthene	18.5	13.4	**	"	11	11	**		
Benzo (ghi) perylene	18.6	13.4	**	Ħ	**	**	**	. **	
Benzo (k) fluoranthene	ND	13.4	**	**	н .	11	19	11	
Chrysene	24.6	13.4		tt	**	11	**		i
Dibenzo (a,h) anthracene	ND	13.4	**	10	u ,	•	n	н	
Fluoranthene	76.0	13.4	**	11	**	**	Ħ	**	
Fluorene	14.2	13.4	н	11	"	**	**		
Indeno (1,2,3-cd) pyrene	ND	13.4	**	**	Ħ	11	11	11	
Naphthalene	ND	13.4	**	н	**	16	. 11	11	
Phenanthrene	83.0	13.4	**	Ħ	**	н	u	14	
Pyrene	72.8	13.4	**	**	"	, н.	н	10	
Surr: Fluorene-d10	72.7 %	40-150		······					
Surr: Pyrene-d10	60.5 %	40-150							
Surr: Benzo (a) pyrene-d12	50.1 %	40-150		•					
MW-1 (8-9) (P3C0737-04) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
Acenaphthylene	ND	13.4	"	'n	er '	11	11	**	
Anthracene	ND	13.4	n	**		**	**	**	
Benzo (a) anthracene	24.8	13.4	**	**	**		**	**	
Benzo (a) pyrene	29.5	13.4	н	"	**	u	**	**	
Benzo (b) fluoranthene	21.9	13.4	н	**		"	**		
Benzo (ghi) perylene	26.2	13.4	и	"	н	**	**	**	
Benzo (k) fluoranthene	18.8	13.4	91	**	#	**	**	"	
Chrysene	32.5	13.4	**	**	**	"	#	"	
Dibenzo (a,h) anthracene	ND	13.4	н	**	"	**	**	11	
Fluoranthene	49.2	13.4	11	**	**	**	11	n	
Fluorene	ND	13.4	41	н	"	"	Ħ		
Indeno (1,2,3-cd) pyrene	19.2	13.4	11	н	**	**	**	. "	

North Creek Analytical - Portland Philip Nevenberg

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Philip Nerenberg, Laboratory Manager

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GeoDesign Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Portland, OR 97224

Project Number: na

Reported:

Project Manager: Paul Trone

04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

	Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
٠,	MW-1 (8-9) (P3C0737-04) Soil				;	Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
	Naphthalene	ND	13.4	ug/kg dry	1.	EPA 8270m	04/03/03	04/08/03	3040110	
-	Phenanthrene	42.8	13.4	tt .	Ħ	**	и .	"	"	
	Pyrene	61.6	13.4	**	**	**	н .	"	"	
	Surr: Fluorene-d10	93.2 %	40-150				,	•		
	Surr: Pyrene-d10	85.6%	40-150							
	Surr: Benzo (a) pyrene-d12	83.5 %	40-150							
	MW-2 (18-20) (P3C0737-05) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
-1	Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/07/03	3040110	
1	Acenaphthylene	ND	. 13.4	11	н		Ħ	er '	11	
	Anthracene	ND	13.4	**	н	**	1.41	**	ii.	
	Benzo (a) anthracene	ND	13.4	. "	н		11	**	11	•
	Benzo (a) pyrene	ND	13.4	**	**		41	"	11	
-	Benzo (b) fluoranthene	ND	13.4	н	н		11	н	**	
	Benzo (ghi) perylene	ND	13.4	н	II	"	-11	"	**	
	Benzo (k) fluoranthene	ND	13.4	н	11	. "	**	"	**	
٠,	Chrysene	ND	13.4	**	**	n'	"	"	#	
	Dibenzo (a,h) anthracene	ND	13.4	#	n	H	"	"	н	
1	Fluoranthene	ND	13.4	**	, н	"	. "	. "	**	
	Fluorene	ND	13.4	**	**	"	*	"	**	
	Indeno (1,2,3-cd) pyrene	ND	13.4	11	и, .	Ħ	*	"	н	
	Naphthalene	ND	13.4	11	**	#	**	u	**	
	Phenanthrene	ND	13.4	**	Ħ	"	"	**	**	
(.)	Pyrene	ND	13.4	#	11	. #	Ħ	17	**	
	Surr: Fluorene-d10	54.0 %	40-150							
	Surr: Pyrene-d10	48.4 %	40-150							
	Surr: Benzo (a) pyrene-d12	17.7 %	40-150							S-09
				•						

North Creek Analytical - Portland

Philip Nevenberg

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GeoDesign 14945 SW Sequoia Parkway, Suite 170 Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Portland, OR 97224

Project Number: na

Reporting

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

Analyte	Result	Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (23-25) (P3C0737-06) Soil	,				Sampled: 03/2	1/03 Recei	ved: 03/25/0	03	
Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
Acenaphthylene	ND	13.4	**	44	n	. 11		**	
Anthracene	ND	. 13.4	ŧŧ	**	ÿ.	11	**	**	
Benzo (a) anthracene	ND	13.4	**	**	**	#1		11	
Benzo (a) pyrene	ND	13.4	**	17	. "	11	**	**	
Benzo (b) fluoranthene	ND	13.4	**	**	**	н	**		
Benzo (ghi) perylene	ND	13.4	11		11	H	**	**	
Benzo (k) fluoranthene	ND	13.4	11	n	н	н	. "	tt.	
Chrysene	ND	13.4	Ħ	"	n	, и	**	**	
Dibenzo (a,h) anthracene	ND	13.4	Ħ			**	, "	н	
Fluoranthene	ND	13.4	11	**	**	**	11	**	
Fluorene	ND	13.4	e	**	**	11	"	Ĥ	
Indeno (1,2,3-cd) pyrene	ND	13.4	11	**	Ħ	11	11	**	
Naphthalene	ND	13.4	**	*1	**	11	**	41	
Phenanthrene	ND	13.4	**	**	**	**	**	11	
Pyrene	ND	13.4	n	и	• .	**	н	n	
Surr: Fluorene-d10	53.9 %	40-150		·-····································					
Surr: Pyrene-d10	54.0 %	40-150						•	
Surr: Benzo (a) pyrene-d12	48.5 %	40-150							
MW-3 (19-20) (P3C0737-07) Soil		ē		;	Sampled: 03/2	1/03 Rece	ived: 03/25/0	03	
Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
Acenaphthylene	ND	13.4	"	н	н .				
Anthracene	ND	13.4	**	**	н	*1	**	а	
Benzo (a) anthracene	ND	13.4	"	**	**	R	, #	**	
Benzo (a) pyrene	ND	13.4	"	11	#	**	"	**	-
Benzo (b) fluoranthene									
	ND	13.4	11	"	**		. 41	#1	
	ND ND	13.4 13.4	"	11	11	11	. 11	#1	
Benzo (ghi) perylene	ND		11 11			# · · · · · · · · · · · · · · · · · · ·			
Benzo (ghi) perylene Benzo (k) fluoranthene	ND ND	13.4	. "	11	**	11 11 11		н	
Benzo (ghi) perylene Benzo (k) fluoranthene Chrysene	ND ND ND	13.4 13.4		" "	11 11	# # # # # # # # # # # # # # # # # # #	11	# #1	
Benzo (ghi) perylene Benzo (k) fluoranthene	ND ND ND ND	13.4 13.4 13.4		:: :: ::	11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	# #	11 11	
Benzo (ghi) perylene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene Fluoranthene	ND ND ND ND ND	13.4 13.4 13.4 13.4	11 11	11 11 11	11 11		11 11	11	
Benzo (ghi) perylene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene Fluoranthene Fluorene	ND ND ND ND ND ND	13.4 13.4 13.4 13.4 13.4		11 11 11	11 11		# # # # # # # # # # # # # # # # # # #	11	
Benzo (ghi) perylene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene	ND ND ND ND ND ND ND	13.4 13.4 13.4 13.4 13.4 13.4	11 11 11	11 11 11	11 11 11 11	11	11 11 11	11	
Benzo (ghi) perylene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene	ND ND ND ND ND ND ND	13.4 13.4 13.4 13.4 13.4 13.4 13.4	11 11 11 11	11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	# #	" "	11	
Benzo (ghi) perylene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene	ND ND ND ND ND ND ND	13.4 13.4 13.4 13.4 13.4 13.4	11 11 11 11 11 11 11 11 11 11 11 11 11	0 0 0	11 11 11 11 11 11 11 11 11 11 11 11 11	# # #	" " " " " " " " " " " " " " " " " " " "	11	

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Project Number: na

907.334.9200 fax 907.334.9210

Portland, OR 97224

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

Project: MarineFin-1-01

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-3 (19-20) (P3C0737-07) Soil					Sampled: 03/2	1/03 Recei	ived: 03/25/0)3	· · ·
Surr: Pyrene-d10	44.9 %	40-150						***	
Surr: Benzo (a) pyrene-d12	40.6 %	40-150				,			
MW-4 (18-19) (P3C0737-08) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/6	03	
Acenaphthene	15.9	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	**********
Acenaphthylene	ND	13.4	" " " " "		11	"	"	"	
Anthracene	. ND	13.4	**		н	11	"	**	
Benzo (a) anthracene	43.4	13.4	. 11	"	н ,	11	· #1	*1	
Benzo (a) pyrene	59.7	13.4	11	11	"	tr	**	44	
Benzo (b) fluoranthene	35.5	13.4	ti	11	"	. **	tt	11	
Benzo (ghi) perylene	62.6	13.4	н	"	" .			н.	
Benzo (k) fluoranthene	41.5	13.4	н	**	11		**		
Chrysene	55.6	13.4	11	**	•	n	**	. "	
Dibenzo (a,h) anthracene	ND	13.4	**	11	**	11		n	
Fluoranthene	51.5	13.4	11	11	11	**	ŧŧ	**	
Fluorene	14.3	13.4	ti	11		"	**	11	
Indeno (1,2,3-cd) pyrene	43.2	13.4	**	11	**		#	н	
Naphthalene	ND	13.4	u	Ħ	**	**	et	н	
Phenanthrene	27.0	13.4	**	н		**	**	11	
Pyrene	102	13.4	"	п	11	"	H 1	tt	
Surr: Fluorene-d10	60.9 %	40-150		-					
Surr: Pyrene-d10	55.1 %	40-150							
Surr: Benzo (a) pyrene-d12	56.0 %	40-150							
MW-5 (22-23) (P3C0737-09) Soil	¥.				Sampled: 03/2	1/03 Page	ived: 03/25/	n2	
Acenaphthene	ND	12.4	//1						
Acenaphthylene	ND ND	13.4 13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
Anthracene			"	"		"	и	11	
	ND	13.4	n	**	"			**	
Benzo (a) anthracene	35.4	13.4	"	**	"	"	"	"	
Benzo (a) pyrene Renzo (b) fluorenthene	57.9 22.4	13.4	"	**	"	.,	**	**	
Benzo (b) fluoranthene	32.4	13.4		"			"	"	
Benzo (ghi) perylene	57.9	13.4	"	"		"	**	,,	
Benzo (k) fluoranthene	34.8	13.4	"	"		**	**	"	
Chrysene Dibergo (a b) anthrocene	47.3	13.4		.,	**	41	**		
Dibenzo (a,h) anthracene Fluoranthene	ND	13.4			"	41			
Fluorene Fluorene	88.8	13.4	"	"	"	"	"	••	
	ND	13.4					"		
Indeno (1,2,3-cd) pyrene	38.8	13.4	m	"	"	11	11	**	

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Reported:

Project Manager: Paul Trone

Project Number: na

04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-5 (22-23) (P3C0737-09) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Naphthalene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
Phenanthrene	38.6	13.4	Ħ	u	÷r ·	"		**	
Pyrene	137	13.4	ů	н	H ·	`n	. #	*	
Surr: Fluorene-d10	57.5 %	40-150							
Surr: Pyrene-d10	57.4 %	40-150							
Surr: Benzo (a) pyrene-d12	51.5 %	40-150							,
MW-6 (13-15) (P3C0737-10) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	R-05
Acenaphthene	ND	26.8	ug/kg dry	2	EPA 8270m	04/03/03	04/07/03	3040110	
Acenaphthylene	ND	26.8	**	Ħ	**		**	**	
Anthracene	ND	26.8	**	Ħ	•	"	**	tt .	
Benzo (a) anthracene	70.2	26.8	"	ti	11	**	н	11	
Benzo (a) pyrene	124	26.8	и	#	10	"	**	**	
Benzo (b) fluoranthene	85.2	26.8	*	Ħ		11	. "	**	
Benzo (ghi) perylene	149	26.8	**	If	**	**	"	"	
Benzo (k) fluoranthene	71.4	26.8	H	lt.	"	**	**	**	
Chrysene	98.5	26.8	u	**	**	tt	**	"	
Dibenzo (a,h) anthracene	ND	26.8	. "	н	**	**	11	•	
Fluoranthene	137	26.8	**	н	. **	**	**	**	
Fluorene	ND	26.8		н	**	**	ŧr	tt t	
Indeno (1,2,3-cd) pyrene	100	26.8	**	11	"	н	"	"	
Naphthalene	ND	26.8	**	н	11	11	н	"	
Phenanthrene	60.7	26.8	"	11	н	н			
Pyrene	169	26.8	н	н	. "	tt ·	"	**	
Surr: Fluorene-d10	55.9 %	40-150							
Surr: Pyrene-d10	51.3 %	40-150							
Surr: Benzo (a) pyrene-d12	49.7%	40-150							

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Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

neFin-1-01 907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (14-15) (P3C0737-11) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/07/03	3040110	
Acenaphthylene	ND	13.4	u	#	**	Ħ	и	"	
Anthracene	ND	13.4	" .	11		**	"	"	
Benzo (a) anthracene	ND	13.4	"	Ħ	11	**	**	n	
Benzo (a) pyrene	ND	13.4	11	. 10	Ħ	**	**	Ħ	
Benzo (b) fluoranthene	ND	13.4	Ħ	н		11	н 1	"	•
Benzo (ghi) perylene	. ND	13.4	Ĥ	"		**	, 11	"	•
Benzo (k) fluoranthene	ND	13.4	Ħ	*	11	**	н	н	
Chrysene	ND	13.4		"	e	н	"	**	
Dibenzo (a,h) anthracene	ND	13.4	ζ".	Ħ	"	**		"	
Fluoranthene	ND	13.4	**	н .		**	"	**	
Fluorene	ND	13.4	**	**	**	**	11	it	
Indeno (1,2,3-cd) pyrene	ND	13.4	**		"	11	n	Ħ	
Naphthalene	ND	13.4	**		**	н :	**	**	
Phenanthrene	ND	13.4	"	11	*	**	"	11	
Pyrene	ND	13.4	"	"	"	11	"	**	
Surr: Fluorene-d10	85.4 %	40-150							
Surr: Pyrene-d10	86.3 %	40-150							
Surr: Benzo (a) pyrene-d12	80.0 %	40-150	•						

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Philip Nerenberg, Laboratory Manager

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GeoDesign

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Portland, OR 97224

Project: MarineFin-1-01

3209 Denail Street, Anchorage, A

Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Percent Dry Weight (Solids) per Standard Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit Units	Dilution	Method Pt	epared	Analyzed	Batch	Notes
B-1 (8-10) (P3C0737-01) Soil				Sampled: 03/24/03	Recei	ived: 03/25/	03	,
% Solids	87.7	1.00 % by Weight	1 .	NCA SOP 03	/31/03	04/01/03	3031015	-
B-2 (7-9) (P3C0737-02) Soil				Sampled: 03/24/03	Rece	ived: 03/25/	03	
% Solids	76.4	1.00 % by Weight	1	NCA SOP 03	/31/03	04/01/03	3031015	
B-1 (17-18) (P3C0737-03) Soil				Sampled: 03/24/03	Recei	ived: 03/25/	03	
% Solids	90.2	1.00 % by Weight	1	NCA SOP 03	/31/03	04/01/03	3031015	
MW-1 (8-9) (P3C0737-04) Soil				Sampled: 03/21/03	Rece	ived: 03/25/	03	
% Solids	70.8	1.00 % by Weight	1	NCA SOP 03	/31/03	04/01/03	3031015	
MW-2 (18-20) (P3C0737-05) Soil				Sampled: 03/21/03	Rece	ived: 03/25/	03	
% Solids	81.3	1.00 % by Weight	1	NCA SOP 03	/31/03	04/01/03	3031015	
MW-2 (23-25) (P3C0737-06) Soil				Sampled: 03/21/03	Rece	ived: 03/25/	03	
% Solids	77.3	1.00 % by Weight	1	NCA SOP 03	3/31/03	04/01/03	3031015	
MW-3 (19-20) (P3C0737-07) Soil				Sampled: 03/21/03	Rece	ived: 03/25/	03	
% Solids	87.6	1.00 % by Weight	1	NCA SOP 03	3/31/03	04/01/03	3031015	
MW-4 (18-19) (P3C0737-08) Soil				Sampled: 03/21/03	Rece	ived: 03/25/	03	
% Solids	85.4	1.00 % by Weight	1	NCA SOP 03	3/31/03	04/01/03	3031015	
MW-5 (22-23) (P3C0737-09) Soil				Sampled: 03/21/03	Rece	ived: 03/25/	03	<u> </u>
% Solids	80.0	1.00 % by Weight	1	NCA SOP 03	3/31/03	04/01/03	3031015	

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907.334.9200 fax 907.334.9210

Portland, OR 97224

Project Number: na

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Percent Dry Weight (Solids) per Standard Methods

Project: MarineFin-1-01

North Creek Analytical - Portland

	<u> </u>	· · · · · · · · · · · · · · · · · · ·		•			~ .			
	Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
	MW-6 (13-15) (P3C0737-10) Soil				S	Sampled: 03/2	1/03 Recei	ived: 03/25/	03	
-	% Solids	79.1	1.00 % в	y Weight	1	NCA SOP	03/31/03	04/01/03	3031015	
. 1	MW-1 (14-15) (P3C0737-11) Soil			٠	S	Sampled: 03/2	1/03 Recei	ived: 03/25/	03	
1	% Solids	84.8	1.00 % b	y Weight	1	NCA SOP	03/31/03	04/01/03	3031015	

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Project: MarineFin-1-01

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Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported: 04/18/03 12:13

大学 Arthres(eleptrob) lea	y Rangelly	airneanth	ons per t	WHILE	$\mathbf{E}\mathbf{D}\mathbf{x}\mathbf{M}$	(thods:4	Omathica (c	ionino)		
· ·	Nort	h Creek	Analyti	cal - Po	ortland					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3030967 - EPA 3550 Fuels										
Blank (3030967-BLK1)				Prepare	d & Analy	zed: 03/3	1/03			
Diesel Range Organics	ND	25.0	mg/kg							
Heavy Oil Range Hydrocarbons	ND	50.0	н							
Surr: 1-Chlorooctadecane	4.54		"	4.80		94.6	50-150			
LCS (3030967-BS1)				Ргераге	d & Analy	zed: 03/3	1/03			
Diesel Range Organics	116	25.0	mg/kg	125		92.8	50-150			
Heavy Oil Range Hydrocarbons	67.2	50.0	"	75.0		89.6	50-150	-		
Surr: 1-Chlorooctadecane	4.07		"	4.80		84.8	50-150			
Duplicate (3030967-DUP1)	Sour	rce: P3C07	37-01	Prepare	d & Analy	zed: 03/3	1/03			
Diesel Range Organics	25.1	25.0	mg/kg dry		31.7			23.2	50	
Heavy Oil Range Hydrocarbons	ND	50.0	II	•	57.6			22.0	50	
Surr: 1-Chlorooctadecane	5.46		"	5.47		99.8	50-150			
Duplicate (3030967-DUP2)	Sou	rce: P3C07	37-02	Prepare	d & Analy	zed: 03/3	1/03			
Diesel Range Organics	ND	25.0	mg/kg dry		ND				50	
Heavy Oil Range Hydrocarbons	ND	50.0	"		ND				50	
Surr: 1-Chlorooctadecane	5.46		"	6.28		86.9	50-150			

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Philip Nerenberg, Laboratory Manager

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GeoDesign 14945 SW Sequoia Parkway, Suite 170

Project: MarineFin-1-01 Project Number: na

907.334.9200 fax 907.334.9210

Portland, OR 97224

Arsenic

Beryllium

Cadmium

Chromium

Copper

Nickel

Selenium

Lead

Zinc

Project Manager: Paul Trone

Reported: 04/18/03 12:13

North Creek Analytical - Portland

4.01

0.667

ND

18.9

17.9

27.6

14.2

ND

105

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3030870 - EPA 3050									,	•
Blank (3030870-BLK1)				Prepare	d: 03/26/0	3 Analyz	ed: 03/27/0)3		
Arsenic	ND	0.500	mg/kg							
Beryllium	ND	0.500	**							
Cadmium	ND	0.500	**							
Chromium	ND	0.500	**							
Copper	ND	2.00	**							
Lead	ND	0.500	**							
Nickel	ND	1.00	u							
Selenium	ND	0.500	"							
Zinc	ND	2.00	11							
LCS (3030870-BS1)				Prepare	ed: 03/26/0	3 Analyz	ed: 03/27/	03		
Arsenic	11.7	0.500	mg/kg	10.0		117	80-120			
Beryllium	11.5	0.500		10.0		115	80-120			
Cadmium	11.4	0.500	#1	10.0		114	80-120			
Chromium	11.8	0.500	н	10.0		118	80-120			
Copper	10.4	2.00	* #	10.0		104	80-120	× .		
Lead	9.02	0.500	11	10.0		90.2	80-120			
Nickel	11.9	1.00	tt	10.0		119	80-120			
Selenium	12.0	0.500	"	10.0		120	80-120			
Zinc	10.9	2.00	и	10.0		109	80-120			
Duplicate (3030870-DUP1)	So	urce: P3C07	84-21	Prepare	ed: 03/26/0	3 Analyz	ed: 03/27/	03		

0.373 mg/kg dry

0.373

0.373

0.373

1.49

0.373

0.746

0.373

1.49

North Creek Analytical - Portland

Philip Nevenberg

3.73

0.573

ND

18.8

26.0

15.2

14.5

ND

109

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7.24

15.2

0.531

36.9

57.9

2.09

3.74

40

40

40

40

40

40

40

40

40

Philip Nerenberg, Laboratory Manager

North Creek Analytical, Inc. **Environmental Laboratory Network**

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Q-14



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541.383.9310 fax 541.382.7588

GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported: 04/18/03 12:13

BEA (IIII)/2000/Sexesalielimiis=(cheilie/e North Creek Analytical - Portland %REC Reporting Spike Source RPD Analyte Result Limit Units Level Result %REC Limits RPD Limit Notes Batch 3030870 - EPA 3050 Matrix Spike (3030870-MS1) Source: P3C0784-21 Prepared: 03/26/03 Analyzed: 03/27/03 11.7 87.3 75-125 Arsenic 0.376 mg/kg dry 8.81 4.01 Beryllium 9.16 0.376 8.81 0.667 75-125 96.4 Cadmium 8.36 0.376 8.81 ND 94.9 75-125 Chromium 26.1 0.376 8 81 18 9 75-125 81.7 Copper 25.3 1.50 8.81 17.9 84.0 75-125 Lead 21.0 0.376 8.81 27.6 -74.9 75-125 0-14 Nickel 22.1 0.752 8.81 14.2 89.7 75-125 Selenium 8.67 0.376 8.81 ND 98.4 75-125 Zinc 99.8 1.50 8.81 105 -59.0 75-125 Q-03 Matrix Spike (3030870-MS2) Source: P3C0784-30 Prepared: 03/26/03 Analyzed: 03/27/03 12.5 mg/kg dry 0.391 3.77 98.0 75-125 Arsenic 8.91 Beryllium 10.2 0.391 8.91 0.527 109 75-125 Cadmium 9.04 0.391 8.91 ND 101 75-125 Chromium 29.5 0.391 75-125 8.91 17.5 135 Q-14 Copper 23.0 1.56 8.91 12.0 123 75-125 Lead 13.6 0.391 8.91 6.23 75-125 82.7 Nickel 24.1 0.781 8.91 12.6 129 75-125 Q-14 Selenium 9.10 0.391 8.91 0.455 97.0 75-125 Zinc 77.8 1.56 8.91 60.2 198 75-125 Q-14 Batch 3031013 - EPA 7471 Blank (3031013-BLK1) Prepared & Analyzed: 03/31/03 Mercury ND 0.100 mg/kg LCS (3031013-BS1) Prepared & Analyzed: 03/31/03 1.07 Mercury 0.100 mg/kg 1.00 80-120

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Project Manager: Paul Trone

Project: MarineFin-1-01

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·	N.	orth Creek	Analyti	ical - P	ortland					
		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 3031013 - EPA 7471										
Duplicate (3031013-DUP1)		Source: P3C05	505-27	Prepare	d & Analy	zed: 03/3	1/03			
Mercury	ND	0.100	mg/kg dry		ND				40	
Matrix Spike (3031013-MS1)	. 5	Source: P3C05	505-27	Prepare	d & Analy	zed: 03/3	1/03			
Mercury	1.11	0.0862	mg/kg dry	1.08	ND	103	75-125			
Batch 3040095 - EPA 3050	٠									
Blank (3040095-BLK1)				Prepare	d: 04/02/0	3 Analyz	zed: 04/03/0)3		
Antimony	ND	0.500	mg/kg	_		/				
Silver	ND	0.500	r t -	*						
Thallium	ND	0.500	** .							
LCS (3040095-BS1)				Prepare	ed: 04/02/0	3 Analyz	zed: 04/03/0)3		
Antimony	5.05	0.500	mg/kg	5.00		101	80-120			
Silver	5.06	0.500	#	5.00		101	80-120			
Thallium	4.86	0.500		5.00		97.2	80-120			
Duplicate (3040095-DUP1)		Source: P3D00	043-18	Prepare	ed: 04/02/0	3 Analyz	zed: 04/03/0)3 .		
Antimony	ND	0.500	mg/kg dry		0.123			3.31	40	
Silver	ND	0.500	#		0.0700			6.79	40	
Thallium	ND	0.500	lt .		ND				40	
Matrix Spike (3040095-MS1)	:	Source: P3D0	043-18	Prepare	ed: 04/02/0	3 Analyz	zed: 04/03/0)3		
Antimony	2.13	0.439	mg/kg dry	5.32	0.123	37.7	75-125			Q-
Silver	5.41	0.439	**	5.32	0.0700	100	75-125			
Thallium	5.38	0.439	**	5.32	ND	101	75-125			

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14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Number: na

Project Manager: Paul Trone

Reported:

04/18/03 12:13

North Creek Analytical - Portland

PAVODOVADIO Sistema vytetimi s

ŧ		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3040095 - EPA 3050

Matrix Spike (3040095-MS2)	Sour	ce: P3D0043-19	Prepare	ad: 04/02/0	3 Analyz	ed: 04/03/03	
Antimony	1.38	0.385 mg/kg dry	4.60	0.0659	28.6	75-125	Q-02
_{eq} Silver	4.40	0.385	4.60	0.0701	94.1	75-125	
Thallium	4.27	0.385 "	4.60	ND	92.8	75-125	

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Batch 3030797 - EPA 5035 Blank (3030797-BLK1)

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Project: MarineFin-1-01

Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Prepared: 03/25/03 Analyzed: 03/28/03

North	Creek	Ana	lutical -	Portland
1301411	LICCK	Alla	ivucai -	rviuanu

-7											
	•		Reporting		Spike	Source		%REC		RPD	Ì
	Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Acetone		·ND	2500	ug/kg
Benzene		ND	100	"
Bromobenzene		ND	100	**
Bromochloromethane		ND	100	**
Bromodichloromethane		ND	100	**
Bromoform		ND	100	**
Bromomethane		ND	500	**
2-Butanone	2	ND	1000	**

n-Butylbenzene	ND	500	17
sec-Butylbenzene	ND	100	. **
tert-Butylbenzene	ND	100	u
Carbon disulfide	ND	1000	**
Carbon tetrachloride	ND	100	**
Chlorobenzene	ND	100	. 11
Chloroethane	ND	100	**
Chloroform	ND	100	***

Chloromethane	ND	500	ŧ
2-Chlorotoluene	ND	100	11
4-Chlorotoluene	ND	100	٠
1,2-Dibromo-3-chloropropane	ND	500	•
Dibromochloromethane	ND	100	•
1,2-Dibromoethane	ND	100	٠,

Dibromomethane	ND	100	**
1,2-Dichlorobenzene	ND	100	"
1,3-Dichlorobenzene	ND	100	**
1,4-Dichlorobenzene	ND	100	н
Dichlorodifluoromethane	ND	500	**
1,1-Dichloroethane	ND	100	Ħ

, 2 iomorodinación de la constitución de la constit	112	•••	
1,1-Dichloroethane	ND	100	•
1,2-Dichloroethane	ND	100	•
1,1-Dichloroethene	ND	100	•
cis-1,2-Dichloroethene	ND	100	. •
trans-1,2-Dichloroethene	ND	100	•

1,2-Dichloropropane ND 100 ND 100 1,3-Dichloropropane 2,2-Dichloropropane ND 100

ND

100

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1,1-Dichloropropene

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Project: MarineFin-1-01 Project Number: na

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Portland, OR 97224

GeoDesign

Project Manager: Paul Trone

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		1101	ui Creek	<u>Anaiy</u>	ucai - Pe	<u>)ruana</u>					
		*	Reporting		Spike	Source		%REC		RPD	
1	Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3030797 - EPA 5035								
Blank (3030797-BLK1)				Prepared: 03/2	5/03 Analy	zed: 03/28/03		
cis-1,3-Dichloropropene	ND	100	ug/kg	*			1 10 2002	
trans-1,3-Dichloropropene	ND	100	*					
Ethylbenzene	ND	100	# ,					
Hexachlorobutadiene	ND	200	11					
2-Hexanone	ND	1000	"					
Isopropylbenzene	ND	200	**					
p-Isopropyltoluene	ND	200	**					
4-Methyl-2-pentanone	ND	500	"					
Methyl tert-butyl ether	ND	100						
Methylene chloride	ND	500	**					
Naphthalene	ND	200	н					
n-Propylbenzene	ND	100	tt					
Styrene	ND	100	**					
1,1,1,2-Tetrachloroethane	ND	100	**				•	
1,1,2,2-Tetrachloroethane	ND	100	**					
Tetrachloroethene	ND	100	**					
Toluene	ND	100	**					
1,2,3-Trichlorobenzene	ND	100	**					
1,2,4-Trichlorobenzene	ND	100	+1					
1,1,1-Trichloroethane	ND	100	**					
1,1,2-Trichloroethane	ND	100	"					
Trichloroethene	ND (100						
Trichlorofluoromethane	ND	100	**					
1,2,3-Trichloropropane	ND	100	11 .					
1,2,4-Trimethylbenzene	ND	100	Ħ				•	
1,3,5-Trimethylbenzene	ND	100	. н					
Vinyl chloride	ND	100						
o-Xylene	ND	100	**					
m,p-Xylene	ND	200	**			•		
Surr: 4-BFB	1910		"	2000	95.5	65.4-143		
Surr: 1,2-DCA-d4	2140		"	2000	107	77.7-144		
Surr: Dibromofluoromethane	2050		"	2000	102	66.5-131		
Surr: Toluene-d8	2040		"	2000	102	77.5-143		

North Creek Analytical - Portland Philip Nevenberg

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

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Project Manager: Paul Trone

Reported: 04/18/03 12:13

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	No	<u>rth Creek</u>	Analyti	cal - Po	<u>ortland</u>					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3030797 - EPA 5035				***************************************						
LCS (3030797-BS1)				Prepare	ed: 03/25/0	3 Analyz	red: 03/28/0	3		
Benzene	2500	100	ug/kg	2500		100	81.9-120			
Chlorobenzene	2400	- 100	11	2500		96.0	79.2-120			
1,1-Dichloroethene	2380	100	и	2500		95.2	66.1-120			
Toluene	2430	100	11	2500		97.2	80-120			
Trichloroethene	2300	100	**	2500		92.0	76-120			
Surr: 4-BFB	1870		"	2000		93.5	65.4-143			
Surr: 1,2-DCA-d4	2160		. "	2000		108	77.7-144			
Surr: Dibromofluoromethane	2040		"	2000		102	66.5-131			
Surr: Toluene-d8	2030		"	2000		102	77.5-143			
Matrix Spike (3030797-MS1)	So	urce: P3C06	92-05	Prepare	ed: 03/25/0	3 Analyz	zed: 03/28/0)3		
Benzene	2560	100	ug/kg dry	2670	13.9	95.4	68.5-120			
Chlorobenzene	2470	100	11	2670	17.1	91.9	65.9-120			
1,1-Dichloroethene	2420	100	*	2670	ND	90.6	55.8-120			
Toluene	2490	100	**	2670	, 18.1	92.6	70.3-120			
Trichloroethene	2320	100	и	2670	14.9	86.3	65.5-125			
Surr: 4-BFB	1990		n	2130		93.4	65.4-143			
Surr: 1,2-DCA-d4	2130		"	2130		100	77.7-144			
Surr: Dibromofluoromethane	2020		"	2130		94.8	66.5-131			
Surr: Toluene-d8	2070		" "	2130		97.2	77.5-143			
Matrix Spike Dup (3030797-MSD1)	So	urce: P3C06	92-05	Prepare	ed: 03/25/0	3 Analyz	zed: 03/28/0)3		
Benzene	2530	100	ug/kg dry	2670	13.9	94.2	68.5-120	1.18	25	
Chlorobenzene	2470	100	**	2670	17.1	91.9	65.9-120	0.00	25	
1,1-Dichloroethene	2430	100	"	2670	ND	91.0	55.8-120	0.412	25	
Toluene	2480	100	"	2670	18.1	92.2	70.3-120	0.402	25	
Trichloroethene	2310	100	**	2670	14.9	86.0	65.5-125	0.432	25	
Surr: 4-BFB	1930		"	2130		90.6	65.4-143			

2130

2130

2130

2140

2040

2070

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Surr: 1,2-DCA-d4

Surr: Toluene-d8

Surr: Dibromofluoromethane

Philip Nerenberg, Laboratory Manager

Philip Neverberg

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77.7-144

66.5-131

77.5-143

100

95.8

97.2

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GeoDesign 14945 SW Sequoia Parkway, Suite 170

Project Number: na

907.334.9200 fax 907.334.9210 **Reported:**

Portland, OR 97224

Project Manager: Paul Trone

Project: MarineFin-1-01

04/18/03 12:13

	Nor	th Creek	Analyt	tical - Po	ortland					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040110 - EPA 3550										
Blank (3040110-BLK1)				Prepare	d: 04/03/0	3 Analyz	ed: 04/07/0)3		***************************************
Acenaphthene	ND	13.4	ug/kg	*						
Acenaphthylene	ND	13.4	**							
Anthracene	ND	13.4	*							
Benzo (a) anthracene	ND	13.4	"							
Benzo (a) pyrene	ŊD	13.4	"							
Benzo (b) fluoranthene	ND	13.4	**							
Benzo (ghi) perylene	ND	13.4	tt.							
Benzo (k) fluoranthene	ND	13.4	. #		1.					
Chrysene	ND	13.4	**							
Dibenzo (a,h) anthracene	ND	13.4	**							
Fluoranthene	ND	13.4	**				4			
Fluorene	ND	13:4	н							
Indeno (1,2,3-cd) pyrene	ND	13.4	11							
Naphthalene	ND	13.4	n							
Phenanthrene	ND	13.4	11							
Pyrene	ND	13.4	"							
Surr: Fluorene-d10	69.2		н	83.3		83.1	40-150			
Surr: Pyrene-d10	71.9		"	83.3		86.3	40-150			
Surr: Benzo (a) pyrene-d12	66.0		n	83.3		79.2	40-150			
LCS (3040110-BS1)				Prepare	d: 04/03/0	3 Analyz	ed: 04/07/0)3		
Acenaphthene	135	13.4	ug/kg	167		80.8	33-139			
Benzo (a) pyrene	138	13.4	"	167		82.6	45-149			
Pyrene	121	13.4	**	167		72.5	39-138			
Surr: Fluorene-d10	71.7		"	83.3		86.1	40-150			
Surr: Pyrene-d10	71.5		"	83.3		85.8	40-150			
Surr: Benzo (a) pyrene-d12	70.8		"	83.3		85.0	40-150			

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Philip Merenberg

Philip Nerenberg, Laboratory Manager

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Project: MarineFin-1-01

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907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Project Number: na

Reported:

04/18/03 12:13

North Creek Analytical - Portland

- 1						···					
. 1	1		* .		*						
	(1		Reporting		Spike	Source		%REC		RPD	
- 1	(1		acpoining		phive	Dource		/IICEC		шь	
. 1	A malanda	D14	T ::4	T I 14	r1	D14	A/DEC	T foresteen	DDD	T 114	37-4
- 1	Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
	4 -										

Datab	304011	n Terdora	2550
Katen	.504011	II - KPA	12211

Matrix Spike (3040110-MS1)	Sour	ce: P3C07	37-01	Prepare	d: 04/03/0	3 Analyz	ed: 04/07/	03		R-05
Acenaphthene	136	26.8	ug/kg dry	190	45.3	47.7	33-139			
Benzo (a) pyrene	264	26.8	**	190	114	78.9	45-149			
Pyrene	422	26.8	"	190	327	50.0	39-138			
Surr: Fluorene-d10	48.2		"	95.0		50.7	40-150			
Surr: Pyrene-d10	44.8		"	95.0		47.2	40-150			
Surr: Benzo (a) pyrene-d12	43.9		"	95.0		46.2	40-150			
Matrix Spike Dup (3040110-MSD1)	Sour	ce: P3C07	37-01	Prepare	d: 04/03/0	3 Analyz	ed: 04/07/	03	-	R-05
Acenaphthene	144	26.8	ug/kg đry	190	45.3	51.9	33-139	5.71	60	
Benzo (a) pyrene	225	26.8	н ,	190	114	58.4	45-149	16.0	60	
Pyrene	419	26.8	. "	190	327	48.4	39-138	0.713	60	
Surr: Fluorene-d10	51.6		"	95.0	,	54.3	40-150			
Surr: Pyrene-d10	46.7		"	95.0		49.2	40-150			
Surr: Benzo (a) pyrene-d12	45.3		"	95.0		47.7	40-150			

North Creek Analytical - Portland

Philip Nerenberg, Laboratory Manager

Philip Nevenberg

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

> North Creek Analytical, Inc. **Environmental Laboratory Network**

Page 32 of 34



425.420.9200 fax 425.420.9210

East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 Spokane

509.924.9200 fax 509.924.9290

9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 Portland 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

3209 Degali Sireet, Anchorage, A 907.334.9200 fax 907.334.9210

Reported:

04/18/03 12:13

11011	II CIECK Allalytic	- 1 L	<u>л папп</u>		· · · · · · · · · · · · · · · · · · ·			
	Reporting	Spike	Source		%REC		RPD	
Result	Limit Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Sour	ce: P3C0737-01	Prepare	d: 03/31/0	3 Analyz	ed: 04/01/0	03		
88.0	1.00 % by Weight		87.7			0.341	20	
Sour	rce: P3C0737-03	Prepare	d: 03/31/0	3 Analyz	ed: 04/01/0	03		·
90.2	1.00 % by Weight		90.2			0.00	20	
Sour	rce: P3C0899-01	Prepare	d: 03/31/0	3 Analyz	ed: 04/01/0	03		
83.7	1.00 % by Weight		83.3		· · · · · · · · · · · · · · · · · · ·	0.479	20	
	Sour 88.0 Sour 90.2 Sour	Result Limit Units	Result Reporting Spike Level	Result Reporting Limit Spike Level Source Result Source: P3C0737-01 Prepared: 03/31/0 88.0 1.00 % by Weight 87.7 Source: P3C0737-03 Prepared: 03/31/0 90.2 1.00 % by Weight 90.2 Source: P3C0899-01 Prepared: 03/31/0	Source: P3C0737-01 Prepared: 03/31/03 Analyz 88.0 1.00 % by Weight 87.7 Source: P3C0737-03 Prepared: 03/31/03 Analyz 90.2 1.00 % by Weight 90.2 Source: P3C0899-01 Prepared: 03/31/03 Analyz	Result Reporting Limit Spike Level Source Result %REC Limits Source: P3C0737-01 Prepared: 03/31/03 Analyzed: 04/01/03 88.0 1.00 % by Weight 87.7 Source: P3C0737-03 Prepared: 03/31/03 Analyzed: 04/01/03 90.2 1.00 % by Weight 90.2 Source: P3C0899-01 Prepared: 03/31/03 Analyzed: 04/01/03	Result Reporting Limit Spike Level Source Result %REC Limits RPD Source: P3C0737-01 Prepared: 03/31/03 Analyzed: 04/01/03 88.0 1.00 % by Weight 87.7 0.341 Source: P3C0737-03 Prepared: 03/31/03 Analyzed: 04/01/03 90.2 1.00 % by Weight 90.2 0.00 Source: P3C0899-01 Prepared: 03/31/03 Analyzed: 04/01/03	Result Reporting Limit Spike Level Source Result %REC Limits RPD Limit Source: P3C0737-01 Prepared: 03/31/03 Analyzed: 04/01/03 88.0 1.00 % by Weight 87.7 0.341 20 Source: P3C0737-03 Prepared: 03/31/03 Analyzed: 04/01/03 90.2 1.00 % by Weight 90.2 0.00 20 Source: P3C0899-01 Prepared: 03/31/03 Analyzed: 04/01/03

North Creek Analytical - Portland

Philip Nevenberg

Philip Nerenberg, Laboratory Manager

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> North Creek Analytical, Inc. Environmental Laboratory Network

Page 33 of 34



425.420.9200 fax 425.420.9210

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

Project: MarineFin-1-01

GeoDesign 14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Notes and Definitions

D-13 Sample extract was cleaned-up to remove suspect biogenic interference	D-13	Sample extract was cleaned-up to remove suspect biogenic interference.
--	------	--

- Q-02 The spike recovery for this QC sample is outside of established control limits due to sample matrix interference.
- Q-03 The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte already present in the sample.
- 0-14 The Spike Recovery and/or RPD is outside of control limits due to a non-homogeneous sample matrix.
- R-03 The reporting limit for this analyte was raised due to matrix interference.
- R-05 Reporting limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte, and/or matrix interference.
- S-09 Surrogate recovery is outside control limits due to matrix interference.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.
- Sample results reported on a wet weight basis (as received) wet
- RPD Relative Percent Difference

North Creek Analytical - Portland

Philip Nevemberg

North Creek Analytical, Inc.

Environmental Laboratory Network

The results in this report apply to the samples analyzed in accordance with the chain of

custody document. This analytical report must be reproduced in its entirety.

Page 34 of 34

Philip Nerenberg, Laboratory Manager



11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-9508
11115 E Montgomery Suite B, Spokane, WA 99206-4776
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20332 Empire Ave Suite F-1, Bend, OR 99701-5711
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425-420-9200
509-924-9200
FAX 924-9290
FAX 906-9210
541-383-9310
FAX 382-7588
907-334-9200
FAX 334-9210

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	CHAIN OF	CUSTOI	Y RE	PORT				Work O			
CLIENT: (JEDDESKIN I	7C:		INVOICE	TO: GD	I			Т		UND REQUEST `	
REPORT TO: PAUL TRONE	•	ŀ		W						iness Days *	.
ADDRESS: 14945 SW SEC POPTUAD, OR 97 PHONE: 503-9(5-9787AX: 50	Wold PRWY, S	STE. 170							,	rganic Analyses	
POPETIAND, OR 97	1224		P.O. NUM	DED	· · · · · · · · · · · · · · · · · · ·			10 7 STD. 7	5 4	3 2 1 Indication Analyses	<1
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11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-9508 11115 E Montgomery Suite B, Spokane, WA 99206-4776 9405 SW Nimbus Ave, Beaverton, OR 97008-7132 20332 Empire Ave Suite F-1, Bend, OR 99701-5711 3209 Denali St, Anchorage, AK 99503-4030

425-420-9200	FAX 420-9210	
509-924-9200	FAX 924-9290	
503-906-9200	FAX 906-9210	
541-383-9310	FAX 382-7588	
907-334-9200	FAX 334-9210	

	CHAIN O	FC	CUS	TO	DY	RE	PO	RT							Work O	rder#	: M3C07	37
CLIENT: GEODESILY	Tar.					DICE		GD							Т	URNAJ	ROUND REQUEST	
REPORT TO: PAUL TADDRESS: 14945 SW. ROMELAND, PHONE: 503-968-918-9 PROJECT NAME: MAIN	RONE SEQUOIA PRWY, S OR 97224	77E. [70											in Business Days * Organic & Inorganic Analyses 10 7 5 4 3 2 1 < 1				
PHONE: 503-968-8787	FAX: 503-96(-30	168			P.O. 1										STD.		Hydrocarbon Analyses	_
PROJECT NAME: MAGA	NE FIN-1-01						PRES	ERV	ATIVE		1				1		3 2 1 <	<u>.</u>
PROJECT NUMBER:					REQUESTED ANALYSES									372	CTED	a 10		
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20 May, 2003

Paul Trone GeoDesign 14945 SW Sequoia Parkway,Suite 170 Portland, OR 97224

RE: MarineFin-1-01

Enclosed are the results of analyses for samples received by the laboratory on 05/09/03 11:32. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Philip Nerenberg Laboratory Manager

Work Orders included in this report:

P3E0282

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported:

05/20/03 12:24

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1 (8-9)	P3E0282-01	Soil	03/21/03 12:00	05/09/03 11:32
MW-4 (18-19)	P3E0282-02	Soil	03/21/03 12:00	05/09/03 11:32
MW-6 (13-15)	P3E0282-03	Soil	03/21/03 12:00	05/09/03 11:32

North Creek Analytical - Portland Philip Nevemberg

Philip Nerenberg, Laboratory Manager

The results in this report apply to the samples analyzed in accordance with the chain o, custody document. This analytical report must be reproduced in its entirety.

Page 1 of 4

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported:

05/20/03 12:24

TCLP Metals per EPA 1311/6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (8-9) (P3E0282-01) Soil					Sampled: 03/2	1/03 Rece	ived: 05/09/	03	
Lead	ND	0.100	mg/l	. 1	1311/6020A	05/09/03	05/14/03	3050434	
MW-4 (18-19) (P3E0282-02) Soil					Sampled: 03/2	1/03 Rece	ived: 05/09/	03	
Lead	ND	0.100	mg/l	. 1	1311/6020A	05/09/03	05/14/03	3050434	
MW-6 (13-15) (P3E0282-03) Soil					Sampled: 03/2	21/03 Rece	ived: 05/09/	03	
Lead	ND	0.100	mg/l	1	1311/6020A	05/09/03	05/14/03	3050434	

North Creek Analytical - Portland

Philip Nerenberg, Laboratory Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Page 2 of 4

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported:

05/20/03 12:24

Y CONTRACTOR STREET, WANTE	ទៅទី ទូចខ្មែរ	estisti (või)	iniz ili in	Strates N		a dinan	iy të mit	dia s		
	No	rth Creek	Analy	tical - Po	ortland					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3050434 - EPA 1311/3005		<u></u>								
Blank (3050434-BLK1)				Prepare	d: 05/09/0	3 Analyz	zed: 05/14/	03		
Lead	ND	0.100	mg/l							
LCS (3050434-BS1)				Prepare	d: 05/09/0	3 Analyz	zed: 05/14/	03		
Lead	4.77	0.100	mg/l	5.00		95.4	75-125			
Matrix Spike (3050434-MS1)	So	urce: P3E028	82-01	Prepare	d: 05/09/0	3 Analyz	zed: 05/14/	03		
Lead	4.85	0.100	mg/l	5.00	0.0154	96.7	50-150			

North Creek Analytical - Portland

Philip Neverberg

Philip Nerenberg, Laboratory Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Page 3 of 4

Project: MarineFin-1-01

14945 SW Sequoia Parkway, Suite 170

Project Number: na

Reported:

Portland, OR 97224

Project Manager: Paul Trone

05/20/03 12:24

Notes and Definitions

DET

Analyte DETECTED

ND

Analyte NOT DETECTED at or above the reporting limit

NR

Not Reported

dry

Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.

wet

Sample results reported on a wet weight basis (as received)

RPD

Relative Percent Difference

North Creek Analytical - Portland

Philip Nevenberg

The results in this report apply to the samples analyzed in accordance with the chain o, custody document. This analytical report must be reproduced in its entirety.

Philip Nerenberg, Laboratory Manager

Page 4 of 4

30 April, 2003

Paul Trone GeoDesign 14945 SW Sequoia Parkway,Suite 170 Portland, OR 97224

RE: MarineFin-1-01

Enclosed are the results of analyses for samples received by the laboratory on 04/16/03 09:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Philip Nerenberg Laboratory Manager

Work Orders included in this report:

P3D0519

GeoDesign Project: MarineFin-1-01
14945 SW Sequoia Parkway,Suite 170 Project Number: na Reported:
Portland, OR 97224 Project Manager: Paul Trone 04/30/03 16:16

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	P3D0519-01	Water	04/15/03 11:45	04/16/03 09:30
MW-2	P3D0519-02	Water	04/15/03 12:47	04/16/03 09:30
MW-3	P3D0519-03	Water	04/15/03 13:25	04/16/03 09:30
MW-4	P3D0519-04	Water	04/15/03 14:04	04/16/03 09:30
MW-5	P3D0519-05	Water	04/15/03 14:54	04/16/03 09:30
MW-6	P3D0519-06	Water	04/15/03 15:30	04/16/03 09:30

North Creek Analytical - Portland
Philip Merenberg

Philip Nerenberg, Laboratory Manager

The results in this report apply to the samples analyzed in accordance with the chain o, custody document. This analytical report must be reproduced in its entirety.

Page 1 of 21

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported:

04/30/03 16:16

Total Metals per EPA 6000/7000 Series Methods North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (P3D0519-01) Water					Sampled: 04/1:	5/03 Rece	ived: 04/16/0	03	
Antimony	ND	0.00100	mg/l	1	EPA 6020	04/21/03	04/22/03	3040749	
Arsenic	ND	0.00100	**	u		**	04/28/03	н	
Beryllium	ND	0.00100	. 11	11	11	11	04/22/03	11	
Cadmium	ND	0.00100	17	**	11	Ħ	11	n	
Chromium	ND	0.00100	11	#	10		11	e e	
Copper	ND	0.00200	*1	**	n	•	н	**	
Lead	ND	0.00100	n	. **	n	n	04/25/03	11	
Mercury	ND	0.000200	11	11	EPA 7470A	04/21/03	04/21/03	3040726	
Nickel	ND	0.00200	n	11	EPA 6020	04/21/03	04/22/03	3040749	
Selenium	ND	0.00100	**	#1		н	. "	**	
Silver	ND	0.00100	. 11	"	Ħ	Ħ	n	11	
Thallium	ND	0.00100		19	n	n	04/25/03	11	
Zinc	ND	0.00500	n _	Ħ	16	11	04/22/03	11	
MW-2 (P3D0519-02) Water				. 1	Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Antimony	ND	0.00100	mg/l	1	EPA 6020	04/21/03	04/22/03	3040749	
Arsenic	0.00139	0.00100	н	11	11	91	04/28/03	**	
Beryllium	ND	0.00100	**	н	. "	11	04/22/03	**	
Cadmium	ND	0.00100	II	11	**	**	**	н	
Chromium	ND	0.00100	11	ti	#	Ħ	n	11	
Copper	ND	0.00200	*1	11	. "	**	ıt	Ħ	
Lead	ND	0.00100	#	11	"	ir .	04/28/03	***	
Mercury	ND	0.000200	#1	10	EPA 7470A	04/21/03	04/21/03	3040726	
Nickel	ND	0.00200	н	n	EPA 6020	04/21/03	04/22/03	3040749	
Selenium	ND	0.00100	**	**	Ħ	. 11	n	H	
Silver	0.00138	0.00100	**	11	н .	11	11	tt	
Thallium	ND	0.00100	н	n n	Ħ	"	04/25/03	11	
Zinc	ND	0.00500	11	**	и	n	04/22/03	-11	

North Creek Analytical - Portland

Philip Nevembery

The results in this report apply to the samples analyzed in accordance with the chain o, custody document. This analytical report must be reproduced in its entirety.

Page 2 of 21

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na Project Manager: Paul Trone

Reported: 04/30/03 16:16

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-3 (P3D0519-03) Water				(Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Antimony	ND	0.00100	mg/l	1	EPA 6020	04/21/03	04/22/03	3040749	
Arsenic	0.00120	0.00100	"	11	.	**	04/28/03	н	
Beryllium	ND	0.00100	*	Ħ	11	**	04/22/03	, п	
Cadmium	ND	0.00100	11	"	11			**	
Chromium	0.00183	0.00100	и	11	Ħ	11	!!	11	
Copper	0.00218	0.00200	u	н	er 5	Ħ	11	**	
Lead	0.00117	0.00100	**	н	**	**	04/28/03	11	
Mercury	ND	0.000200	н	#	EPA 7470A	04/21/03	04/21/03	3040726	
Nickel	0.00413	0.00200	**	South	EPA 6020	04/21/03	04/22/03	3040749	
Selenium	ND	0.00100	**	11	n	."		"	
Silver	ND	0.00100	Ħ	, 11	11	ti	"	11	
Thallium	ND	0.00100	H.	н		**	04/25/03		
Zinc	0.00774	0.00500	н	#1	tt	**	04/22/03	н	
MW-4 (P3D0519-04) Water	<u>.</u>			;	Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Antimony	0.00101	0.00100	mg/l	1	EPA 6020	04/21/03	04/22/03	3040749	
Arsenic	0.0195	0.00100	**	**	"	"	04/28/03	n -	
Beryllium	0.00357	0.00100	H	Ħ	11	**	04/22/03	19	
Cadmium	0.00202	0.00100		**	н	. 11	11	11	
Chromium	0.182	0.00100	_ "	11		**	11	11	
Copper	0.435	0.00200	17	Ħ	н	**	Ħ	**	
Lead	0.692	0.00100	, н	n	ti	11	04/28/03		
Mercury	0.000973	0.000200		. 11	EPA 7470A	04/21/03	04/21/03	3040726	
Nickel	0.139	0.00200	17	"	EPA 6020	04/21/03	04/22/03	3040749	
Selenium	0.00103	0.00100	**		n	#1	04/28/03	11	
Silver	0.0149	0.00100	#	u	11	m ,	04/22/03	#	
Thallium	ND	0.00100		. 11	11	u	04/25/03	#1	
Zinc	0.635	0.00500		**	**	11	04/22/03	н	

North Creek Analytical - Portland

The results in this report apply to the samples analyzed in accordance with the chain o custody document. This analytical report must be reproduced in its entirety.

Page 3 of 21

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported: 04/30/03 16:16

Total Metals per EPA 6000/7000 Series Methods North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-5 (P3D0519-05) Water				ξ	Sampled: 04/1:	5/03 Rece	ived: 04/16/0	03	
Antimony	ND	0.00100	mg/l	1	EPA 6020	04/21/03	04/22/03	3040749	
Arsenic	0.00286	0.00100	•	**	n	. "	04/28/03	**	
Beryllium	ND	0.00100	Ħ	н	**	11	04/22/03	H .	
Cadmium	ND	0.00100	11	н	"	II		**	
Chromium	ND	0.00100	tt		н ,	**	tt	n	
Copper	ND	0.00200	н	н	n	11	n	#	
Lead	ND	0.00100	11	Ħ	11	11	04/28/03	11	
Mercury	ND	0.000200	(M	n	EPA 7470A	04/21/03	04/21/03	3040726	
Nickel	ND	0.00200	н	n	EPA 6020	04/21/03	04/22/03	3040749	
Selenium	0.00119	0.00100	tt	H	11	n	n	"	
Silver	ND	0.00100	**	**	II	"	Ħ	н	
Thallium	ND	0.00100	**	**		"	04/25/03	"	
Zinc	ND	0.00500	11	. "	**	tt	04/22/03	"	
MW-6 (P3D0519-06) Water				:	Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Antimony	ND	0.00100	mg/l	1	EPA 6020	04/21/03	04/22/03	3040749	
Arsenic	ND	0.00100	PI	"	n .	11	04/28/03	н	
Beryllium	ND	0.00100	ır	"	n	n	04/22/03	**	
Cadmium	ND	0.00100	11	***	n	rr	18	11	
Chromium	ND	0.00100	**	W	17	11	#	**	
Copper	0.00227	0.00200	11	11	n	**	н	"	
Lead	0.00173	0.00100	, 4	п	н	**	04/28/03	. 11	
Mercury	ND	0.000200	π	H	EPA 7470A	04/21/03	04/21/03	3040726	
Nickel	0.00303	0.00200	11	11	EPA 6020	04/21/03	04/22/03	3040749	
Selenium	ND.	0.00100	n	н	n	11	04/28/03	н.,	
Silver	ND	0.00100	Ħ	11	и	11	04/22/03	tt	
Thallium	ND	0.00100	*	**	Ħ	**	04/25/03	* .	
Zinc	ND	0.00500	11	u.	11	11	04/22/03	**	

North Creek Analytical - Portland Philip Nevenberg

Philip Nerenberg, Laboratory Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported: 04/30/03 16:16

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (P3D0519-02) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Acetone	ND	25.0	ug/l	1	EPA 8260B	04/17/03	04/17/03	3040612	
Benzene	ND ·	1.00	*	Ħ	"	**	Ħ	"	
Bromobenzene	ND	1.00	11	**	11	н	Ħ	11	*
Bromochloromethane	ND	1.00	. 11	**	u	н		, "	
Bromodichloromethane	ND	1.00	**	Ħ	Ħ	Ħ	11	Ħ	
Bromoform	ND	1.00	#	**	**	"	# .	. 41	
Bromomethane	ND	5.00	Ħ	18	n	. " .	Ħ,	**	
2-Butanone	ND	10.0	. "	10	n .	"	#	**	
n-Butylbenzene	ND	5.00	"	11	*	11	tt	. 44	
sec-Butylbenzene	ND	1.00	"	**	"	Ħ	н	**	
tert-Butylbenzene	ND	1.00		u.	и	**		11	
Carbon disulfide	ND	10.0	"	11	11	11	11	**	
Carbon tetrachloride	ND	1.00	**	11	n	n	11	17	
Chlorobenzene	ND	1.00	n	11	ш	n	н	**	
Chloroethane	ND	1.00	н	lf.	11	#	**	11	
Chloroform	ND	1.00		tt ·	11	n	**	н	
Chloromethane	ND	5.00	11	"	Ħ	н		**	
2-Chlorotoluene	ND	1.00	**	H	n	11	"	**	•
4-Chlorotoluene	ND	1.00	11	H	**	"	11	11	
1,2-Dibromo-3-chloropropane	ND	5.00	,,	**	tt	u	11	n	
Dibromochloromethane	ND	1.00	"	Ħ	Ħ	**	**	n	
1,2-Dibromoethane	ND	1.00	#	#1	**	tt	*1		
Dibromomethane	ND	1.00	n	Ħ	H	17	π	"	
1,2-Dichlorobenzene	ND	1.00	**	. 11	n	11	n	n	
1,3-Dichlorobenzene	ND	1.00	**	n	11	11	14	*	
1,4-Dichlorobenzene	ND	1.00	17	. "	11	11	n ·	11	
Dichlorodifluoromethane	ND	5.00	H	11		11	**	n	
1,1-Dichloroethane	ND	1.00	Ħ	n	"	**	n .	11	
1,2-Dichloroethane	ND	1.00	**	u	"	11	**	**	
1,1-Dichloroethene	ND	1.00	11	**	r	n	n	11	
cis-1,2-Dichloroethene	ND	1.00	**	н	**	**	n	ti	
trans-1,2-Dichloroethene	ND -	1,00	11	н	n	11	Ħ	**	
1,2-Dichloropropane	ND	1.00	н	**	n	**	**	11	
1,3-Dichloropropane	ND	1.00	n	11	н	**	16	11	
2,2-Dichloropropane	ND	1.00	11	и	n		н	н	
1,1-Dichloropropene	ND	1.00	n	11	11	n	11	**	
cis-1,3-Dichloropropene	ND -	1.00	н	"	11	**	**	ŧŧ	
trans-1,3-Dichloropropene	ND	1.00	и	"	п	11	**	· #	
Ethylbenzene	ND	1.00	11	**	"	u	11	**	
	.12	2.00							

North Creek Analytical - Portland

Philip Nevemberg Philip Nerenberg, Laboratory Manager The results in this report apply to the samples analyzed in accordance with the chain σ_i custody document. This analytical report must be reproduced in its entirety.

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14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

rrojeen wan

Project Number: na
Project Manager: Paul Trone

Reported:

04/30/03 16:16

Volatile Organic Compounds per EPA Method 8260B North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (P3D0519-02) Water				:	Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	04/17/03	04/17/03	3040612	
2-Hexanone	ND	10.0	н	**	**		"	"	
Isopropylbenzene	ND	2.00	II.	11	11	, n	**	"	
p-Isopropyltoluene	ND	2.00	tt	**	11	. It	11	**	
4-Methyl-2-pentanone	ND	5.00	#1	11	. 11	. "	Ħ	**	
Methyl tert-butyl ether	ND	1.00	11	11	11	11	н	Ħ	
Methylene chloride	ND	5.00	н	**	ıı ıı	п	11	*1	
Naphthalene	ND	2.00	71	и. '	**	**	11	, 11	
n-Propylbenzene	ND	1.00	11	n	n	**	11	11	
Styrene	ND	1.00	11	**	Ħ	**		н "	
1,1,1,2-Tetrachloroethane	ND	1.00	11	н	. н		"	**	
1,1,2,2-Tetrachloroethane	ND	1.00	**	**	**	н	"	. 11	
Tetrachloroethene	ND	1.00	"	**	11	· • • • • • • • • • • • • • • • • • • •	11	. "	
Toluene	ND	1.00	,, .	11	"	**	11		
1,2,3-Trichlorobenzene	ND	1.00	u	н	11	•	#	**	
1,2,4-Trichlorobenzene	ND	1.00	н	H	17	"	"	11	*
1,1,1-Trichloroethane	ND	1.00	**	Ħ	**	н	н	11	
1,1,2-Trichloroethane	ND	1.00	**	"	н	11	11	11	
Trichloroethene	ND	1.00	11	**	n	n	**	11	
Trichlorofluoromethane	ND	1.00	**	и,	**	11	**	11	
1,2,3-Trichloropropane	ND	1.00	17	**	**	"	11	н	
1,2,4-Trimethylbenzene	ND	1.00	Ħ	11	**	u	18	n	
1,3,5-Trimethylbenzene	ND	1.00	н	Ħ	**	*1	Ħ	*1	
Vinyl chloride	ND	1.00	11	Ħ	**	"	n .	**	
o-Xylene	ND	1.00	11	11	**	11	11	n	
m,p-Xylene	ND	2.00	n ;	н	tr	n	11	n	
Surr: 4-BFB	101 %	84.5-124	-					7	
Surr: 1,2-DCA-d4	101 %	77.9-123							
Surr: Dibromofluoromethane	108 %	83.5-119							
Surr: Toluene-d8	97.5 %	84.1-116							

North Creek Analytical - Portland

Philip Nerenberg, Laboratory Manager

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14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported:

04/30/03 16:16

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-6 (P3D0519-06) Water		* 4.			Sampled: 04/1	5/03 Recei	ived: 04/16/	03	
Acetone	ND	25.0	ug/l	1	EPA 8260B	04/17/03	04/17/03	3040612	
Benzene	ND	1.00	**	17		"	**	11	
Bromobenzene	ND	1.00	**	11	"	. н	. #	**	
Bromochloromethane	ND	1.00	۳ .	**	**	**	**	11	
Bromodichloromethane	ND	1.00		n .	• .	11	н	19	
Bromoform	ND	1.00	Ħ	**	u	"	**	n	
Bromomethane	ND	5.00	Ħ	tt.	н ,		11	H	
2-Butanone	ND	10.0	11	17	n .	н	19		
n-Butylbenzene	ND	5.00	"		n	Ħ	, tr	**	
sec-Butylbenzene	ND	1.00	11	**	.91	w.	"	"	
tert-Butylbenzene	ND	1.00	н	и .	11	11	"	n.	
Carbon disulfide	ND	10.0	H .	#	tt	"	11	n	
Carbon tetrachloride	ND	1.00	n	. #		**	11	11	
Chlorobenzene	ND	1.00	n	. 11	"	**	**	11	
Chloroethane	ND	1.00	**	II.	n.	1	"	11	
Chloroform	ND	1.00	18	#	"	n		11	
Chloromethane	ND	5.00	11	11	"	ti	11	77	,
2-Chlorotoluene	ND	1.00	Ħ	Ħ	n	11	11		
4-Chlorotoluene	ND	1.00	**	w	**	11	H	**	
1,2-Dibromo-3-chloropropane	ND	5.00	**	"	u	H	n	17	•
Dibromochloromethane	ND	1.00	11	n	н .	n	Ħ	11,	
1,2-Dibromoethane	ND	1.00	. 41	n	11	**	11	11	
Dibromomethane	ND	1.00	11	n	#	**	11	н	
1,2-Dichlorobenzene	ND	1.00	N	n	н	8	**		
1,3-Dichlorobenzene	ND	1.00	**	ıı	u	n	**	11	
1,4-Dichlorobenzene	ND	1.00	11	н	**	**	"	11	
Dichlorodifluoromethane	ND	5.00		"	**	Ħ	"	n	
1,1-Dichloroethane	ND	1.00	**	11	*	11	n	**	
1,2-Dichloroethane	ND	1.00	**	n	11	. 11	. #	**	
1,1-Dichloroethene	ND	1.00	11	n	. 0	н	Ħ	11	
cis-1,2-Dichloroethene	ND	1.00	H	**	11	. 11	11	**	
trans-1,2-Dichloroethene	ND	1.00	*1	n	**	11	n	н.	
1,2-Dichloropropane	ND	1.00	. 11	n.		19"	н	Ħ	
1,3-Dichloropropane	ND	1.00		. 11	If .	, #	tt .	"	
2,2-Dichloropropane	ND	1.00	n	11	#	Ħ	Ħ	11	
1,1-Dichloropropene	ND	1.00	н	н	n	11	**	. 10	
cis-1,3-Dichloropropene	ND	1.00	"		11	11	11	н	
trans-1,3-Dichloropropene	ND	1.00	11	11	11	**	11	"	
Ethylbenzene	ND	1.00	11	**	**	**	11	,,	

North Creek Analytical - Portland

Philip Nevemberg

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14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported:

04/30/03 16:16

Volatile Organic Compounds per EPA Method 8260B North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Ņotes
MW-6 (P3D0519-06) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	04/17/03	04/17/03	3040612	
2-Hexanone	ND	10.0	11	11	**	"	j n		
Isopropylbenzene	ND	2.00	н		11	n	"	*	
p-Isopropyltoluene	ND	2.00	**	"	n .		•	. "	* 4.
4-Methyl-2-pentanone	ND	5.00	17	. "	Ħ	11	11	11	
Methyl tert-butyl ether	ND	1.00	H	tt	19		11	**	
Methylene chloride	ND	5.00		.9	n	11	11		
Naphthalene	ND	2.00	**	Ħ		"	. "	11	
n-Propylbenzene	ND	1.00	**	**	11	11	11	**	
Styrene	ND	1.00	"	11	n	-1 m	. "		
1,1,1,2-Tetrachloroethane	ND	1.00	11	н	**	"	11	11	
1,1,2,2-Tetrachloroethane	ND	1.00	n	11	!	m ·	n	Ħ	
Tetrachloroethene	ND	1.00	**		n	н	11	n	
Toluene	ND	1.00	н .	Ħ		11	n .	11	
1,2,3-Trichlorobenzene	ND	1.00		11	n	н	н	n	
1,2,4-Trichlorobenzene	ND	1.00	Ħ	11	11	n	11	м .	
1,1,1-Trichloroethane	ND	1.00	. #	**	**	11	"	"	
1,1,2-Trichloroethane	ND	1.00	. 10	. 19	**	tr	н	ti	
Trichloroethene	ND	1.00	. "	n	**	"	11	п	
Trichlorofluoromethane	ND	1.00	Ħ	**	11	11	н	. 11	
1,2,3-Trichloropropane	ND	1.00	Ħ	11	19	Ħ	н	tr	
1,2,4-Trimethylbenzene	ND	1.00	. "	н	н	ŧı	**	n ·	
1,3,5-Trimethylbenzene	ND	1.00	n	. "	n	11	. "	n	
Vinyl chloride	ND	1.00	\$r	**	п		н	n	
o-Xylene	ND	1.00	**	. н	н	*	Ħ	n	
m,p-Xylene	ŅD	2.00	*1		**	n	н	н	
Surr: 4-BFB	102 %	84.5-124							
Surr: 1,2-DCA-d4	101 %	77.9-123							
Surr: Dibromofluoromethane	108 %	83.5-119							
Surr: Toluene-d8	99.5 %	84.1-116							

North Creek Analytical - Portland

Philip Nevemberg Philip Nerenberg, Laboratory Manager The results in this report apply to the samples analyzed in accordance with the chain o, custody document. This analytical report must be reproduced in its entirety.

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14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Reported:

04/30/03 16:16

Polynuclear Aromatic Compounds per EPA 8270M-SIM North Creek Analytical - Portland

Project Manager: Paul Trone

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (P3D0519-01) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/0	03	
Acenaphthene	ND	0.100	ug/l	1	EPA 8270m	04/22/03	04/25/03	3040772	
Acenaphthylene	ND	0.100	*		н	Ħ	**	11	
Anthracene	ND	0.100	**	n	: It	**	11	n	
Benzo (a) anthracene	ND	0.100	**	"	**	11	ŧı	Ħ	
Benzo (a) pyrene	ND	0.100	•	11	#	n	TT .	11	
Benzo (b) fluoranthene	ND	0.100	**	**	11	н		н .	
Benzo (ghi) perylene	ND	0.100	11	. 44	H	11	n	"	
Benzo (k) fluoranthene	ND	0.100	n	. 11	n	n	n	n	
Chrysene	ND	0.100	11	17	II .	Ħ	tr	π.,	
Dibenzo (a,h) anthracene	ND	0.200	Ħ	n	. "	n	"	**	
Fluoranthene	ND .	0.100	11	, if	и	н	u	11	
Fluorene	ND	0.100	**	11	"н	11	**	. #	
Indeno (1,2,3-cd) pyrene	ND	0.100	**	11	n .	Ħ	n		
Naphthalene	ND	0.100	n	**	**	11	11	11	
Phenanthrene	ND	0.100	n	**	n	. 11	10		
Pyrene	ND	0.100	. н	**	п	**	н	**	
Surr: Fluorene-d10	84.9 %	25-125							
Surr: Pyrene-d10	97.5 %	23-150							
Surr: Benzo (a) pyrene-d12	87.0 %	10-125							
MW-2 (P3D0519-02) Water					Sampled: 04/1	5/03 Rece	eived: 04/16/	03	
Acenaphthene	ND	0.100	ug/l	1	EPA 8270m	04/22/03	04/26/03	3040772	
Acenaphthylene	ND .	0.100	н,	Ħ	11	Ħ	11	n.	
Anthracene	ND	0.100	u		. #	77	Ħ	11	
Benzo (a) anthracene	ND	0.100	n	H	н	n	н	11	
Benzo (a) pyrene	ND	0.100	u	*	. #	tt	**	11	
Benzo (b) fluoranthene	ND	0.100	**	*1	11	**	**	n	
Benzo (ghi) perylene	ND	0.100	**	17	<u> </u>	н	**		
Benzo (k) fluoranthene	ND	0.100	n	. н	**	11	17	**	
Chrysene	ND	0.100	10	#1	u	**	u	11	

ND

ND

ND

ND

ND

ND ND

75.2 %

0.200

0.100

0.100

0.100

0.100

0.100

0.100

25-125

North Creek Analytical - Portland Philip Nevemberg

Dibenzo (a,h) anthracene

Indeno (1,2,3-cd) pyrene

Fluoranthene

Naphthalene

Phenanthrene

Surr: Fluorene-d10

Fluorene

Pyrene

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Philip Nerenberg, Laboratory Manager

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14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Reported:

04/30/03 16:16

Polynuclear Aromatic Compounds per EPA 8270M-SIM North Creek Analytical - Portland

Project Manager: Paul Trone

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (P3D0519-02) Water					Sampled: 04/15	5/03 Rece	ived: 04/16/	03	
Surr: Pyrene-d10	85.7 %	23-150		•					
Surr: Benzo (a) pyrene-d12	79.8 %	10-125							
MW-3 (P3D0519-03) Water	,			i	Sampled: 04/1:	5/03 Rece	ived: 04/16/	03	
Acenaphthene	0.490	0.100	ug/l	1	EPA 8270m	04/22/03	04/26/03	3040772	
Acenaphthylene	ND	0.100	**	н	· u	Ħ	н	н	
Anthracene	ND	> 0.100	**	**	11	11	Ħ	**	
Benzo (a) anthracene	· ND	0.100	"	11	n	10 -	Ű	11	
Benzo (a) pyrene	ND	0.100	11 ,	. "	ŧ	ri	Ħ	,#1	
Benzo (b) fluoranthene	ND	0.100	н	**	n	. 11	**	11	
Benzo (ghi) perylene	ND.	0.100	**	11	**	11	, #	11	
Benzo (k) fluoranthene	ND	0.100	11	11	**	*	u	, n	
Chrysene	ND	0.100	. 11	**	, ÿ	11	tt	н	
Dibenzo (a,h) anthracene	. ~ ND	0.200	ır	n	· "	17	11	II	
Fluoranthene	0.795	0.100	11	u	п	. н	11	11	
Fluorene	ND	0.100			**	Ħ	**	H	
Indeno (1,2,3-cd) pyrene	ND	0.100	11	. #	11	Ħ	n	11	
Naphthalene	ND	0.100	R	11	· n	11	**	11	
Phenanthrene	0.117	0.100	**	ш,	n	n	u	er e	
Pyrene	1.11	0.100	**		H	11		н	
Surr: Fluorene-d10	75.0 %	25-125							
Surr: Pyrene-d10	86.4 %	23-150			*				
Surr: Benzo (a) pyrene-d12	74.2 %	10-125							
MW-4 (P3D0519-04) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Acenaphthene	0.808	0.100	ug/l	1	EPA 8270m	04/22/03	04/26/03	3040772	
Acenaphthylene	ND	0.100	H	#1	11	n	19	11	
Anthracene	ND	0.100		11	11	"	Ħ	, 11	
Benzo (a) anthracene	ND	0.100	11	"		н	n	#	
Benzo (a) pyrene	ND	0.100	н	11	**	n	**	n	
Benzo (b) fluoranthene	ND	0.100	**	. "	11	"	н		
Benzo (ghi) perylene	0.100	0.100	"	н	π	u	n	n	
Benzo (k) fluoranthene	ND	0.100	**	π	**	n		11	
Chrysene	0.113	0.100	11	11	**	11	**	11	
Dibenzo (a,h) anthracene	ND	0.200	**	н	**	11	11	11	
Fluoranthene	0.168	0.100	11	P	**	**		н .	
Fluorene	ND	0.100	11	,,	11	11	a	**	

North Creek Analytical - Portland

Philip Nevembery

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Project: MarineFin-1-01

14945 SW Sequoia Parkway, Suite 170

Project Number: na

Reported:

Portland, OR 97224

Project Manager: Paul Trone

04/30/03 16:16

Polynuclear Aromatic Compounds per EPA 8270M-SIM North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-4 (P3D0519-04) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Naphthalene	0.135	0.100	ug/l	1	EPA 8270m	04/22/03	04/26/03	3040772	
Phenanthrene	0.134	0.100	11	н	11 '	**	н	**	
Pyrene	0.649	0.100	**	"	11	"	tt.	**	
Surr: Fluorene-d10	73.5 %	25-125							
Surr: Pyrene-d10	76.9 %	23-150					•		
Surr: Benzo (a) pyrene-d12	53.4 %	10-125							
MW-5 (P3D0519-05) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Acenaphthene	0.196	0.100	ug/l	1	EPA 8270m	04/22/03	04/26/03	3040772	
Acenaphthylene	ND	0.100	n	**	*	u	n	#	
Anthracene	ND	0.100	II	**	· 11	**	(1	u ·	
Benzo (a) anthracene	.· ND	0.100	. 11	Ħ	n		n	n	
Benzo (a) pyrene	ND	0.100	U	**	н	u	U	11	
Benzo (b) fluoranthene	ND	0.100	Ħ	н	11	**	н	**	
Benzo (ghi) perylene	ND	0.100	11	"	н ,	11	*	**	
Benzo (k) fluoranthene	ND	0.100	ŧ	**	**	n	**	41	
Chrysene	ND	0.100	61	11	Ħ	"	Ħ	tł	
Dibenzo (a,h) anthracene	ND	0.200	**	"	n	Ħ	Ħ	11	
Fluoranthene	0.134	0.100	Ħ	11	tt	н	11	**	
Fluorene	ND	0.100	11	Ħ	11	II.	ti	11	
Indeno (1,2,3-cd) pyrene	ND	0.100	"	11	11	. 11	н	"	
Naphthalene	ND	0.100	u	, "	н	Ħ	**	"	
Phenanthrene	0.277	0.100	W	**	11	н	"	u	
Pyrene	0.666	0.100	**	**	H	11	tt	11	
Surr: Fluorene-d10	73.9 %	25-125							
Surr: Pyrene-d10	86.6 %	23-150							

76.1 %

10-125

North Creek Analytical - Portland

Surr: Benzo (a) pyrene-d12

Philip Nerenberg, Laboratory Manager

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14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported:

04/30/03 16:16

Polynuclear Aromatic Compounds per EPA 8270M-SIM North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-6 (P3D0519-06) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Acenaphthene	ND	0.100	ug/l	1	EPA 8270m	04/22/03	04/28/03	3040772	
Acenaphthylene	ND	0.100		н	n	11	Ħ		
Anthracene	ND	0.100	"	"	ri .	11	н '	11	
Benzo (a) anthracene	ND	0.100		11	n	**	Ħ	11	
Benzo (a) pyrene	ND	0.100	. 0	11	"	H	11		
Benzo (b) fluoranthene	ND	0.100	n	**	"	n	t†	**	
Benzo (ghi) perylene	ND	0.100	**	Ħ	11	"	u u		
Benzo (k) fluoranthene	ND	0.100	"	Ħ	н	H	н	**	
Chrysene	ND	0.100	n .	"	n	**	н	11	
Dibenzo (a,h) anthracene	ND	0.200	11	t at	н	11	n	н	
Fluoranthene	ND	0.100	Ħ	**	11	#	. "	tt .	
Fluorene	ND	0.100	11	11	11	**	111	**	•
Indeno (1,2,3-cd) pyrene	ND	0.100	н	H	и,	ti -	n	**	
Naphthalene	ND	0.100	77	Ħ	н .	11	n	*	
Phenanthrene	ND	0.100	**	*	н	н	11	**	
Pyrene	ND	0.100	н	11	**	**		n	
Surr: Fluorene-d10	72.9 %	25-125							
Surr: Pyrene-d10	84.3 %	23-150							
Surr: Benzo (a) pyrene-d12	76.3 %	10-125							

North Creek Analytical - Portland

Philip Nerenberg, Laboratory Manager

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GeoDesign Project: MarineFin-1-01
14945 SW Sequoia Parkway,Suite 170 Project Number: na Reported:
Portland, OR 97224 Project Manager: Paul Trone 04/30/03 16:16

eset es a rbei s est india	(Melaikanéa)		MUSig	rus (vieli	mis-je	ifalli vk	omio).		T Tage	
	Noi	rth Creek	Analy	tical - Po	rtland					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040726 - EPA 7470				•						
Blank (3040726-BLK1)			*	Prepared	l & Analy	zed: 04/2	1/03			
Мегсшу	ND	0.000200	mg/l							
LCS (3040726-BS1)	`	,		Prepared	l & Analy	zed: 04/2	1/03			
Mercury	0.00492	0.000200	mg/l	0.00500		98.4	80-120			
Duplicate (3040726-DUP1)	So	urce: P3D05	19-01	Prepared	ł & Analy	zed: 04/2	1/03			
Мегсигу	ND	0.000200	mg/l		ND				20	
Matrix Spike (3040726-MS1)	So	urce: P3D05	19-01	Prepared	1 & Analy	zed: 04/2	1/03			
Мегсигу	0.00486	0.000200	mg/l	0.00500	ND	97.2	75-125			
Batch 3040749 - EPA 200/3005										
Blank (3040749-BLK1)				Prepared	1: 04/21/0	3 Analyz	ed: 04/22/0	03		
Antimony	ND	0.00100	mg/l	•		.				· · · · ·
Arsenic	ND	0.00100	n							
Beryllium	ND	0.00100	11							
Cadmium	ND	0.00100	n							
Chromium	ND	0.00100	H							
Соррег	ND	0.00200	n							
Lead	ND	0.00100	и							
Nickel	ND	0.00200	11							
Selenium	ND	0.00100	•							
Silver	ND	0.00100	н							
Thallium	ND	0.00100	**							
Zinc	ND	0.00500	11							

North Creek Analytical - Portland

Philip Nevemberg

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GeoDesign Project: MarineFin-1-01
14945 SW Sequoia Parkway,Suite 170 Project Number: na Reported:
Portland, OR 97224 Project Manager: Paul Trone 04/30/03 16:16

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	Noi	rth Creek	Analyt	tical - Po	ortland					
		Reporting		Spike	Source		%REC		RPD	· · · · · · · · · · · · · · · · · · ·
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 3040749 - EPA 200/3005										
LCS (3040749-BS1)				Prepare	d: 04/21/0:	3 Analyz	ed: 04/22/0)3		
Antimony	0.0470	0.00100	mg/l	0.0500		94.0	80-120	-		
Arsenic	0.0973	0.00100	#1	0.100		97.3	80-120			
Beryllium	0.0950	0.00100	#1	0.100		95.0	80-120			
Cadmium	0.0952	0.00100	**	0.100		95.2	80-120			
Chromium	0.108	0.00100	**	0.100		108	80-120			
Copper	0.103	0.00200	n	0.100		103	80-120			
Lead	0.0990	0.00100	Ħ	0.100		99.0	80-120			
Nickel	0.113	0.00200	**	0.100		113	80-120			
Selenium	0.0991	0.00100	11	0.100		99.1	80-120			
Silver	0.0517	0.00100	11	0.0500		103	80-120			
Thallium	0.0502	0.00100	N	0.0500		100	80-120			
Zinc	0.100	0.00500	н	0.100		100	80-120			
Duplicate (3040749-DUP1)	Se	urce: P3D05	19-01	Prepare	ed: 04/21/0	3 Analyz	ed: 04/22/0	03		
Antimony	ND	0.00100	mg/l		ND				20	
Arsenic	, ND	0.00100	11		ND				20	
Beryllium	ND	0.00100	tr.		ND				20	
Cadmium	ND	0.00100	n		ND				20	
Chromium	ND	0.00100	н		ND				20	
Copper	ND	0.00200	n		0.000710			8.11	20	
Lead	ND	0.00100	н		0.000550			31.6	20	O-0
Nickel	ND	0.00200	91		ND				20	
Selenium	ND	0.00100	и .		ND				20	
Silver	ND	0.00100	**		0.0000600				20	
Thallium	ND.	0.00100	**		ND				20	
Zinc	ND	0.00500	11		ND				20	
Matrix Spike (3040749-MS1)	So	urce: P3D05	19-01	Prepare	ed: 04/21/0	3 Analyz	ed: 04/22/	03		
Antimony	0.0471	0.00100	mg/l	0.0500	ND	94.2	75-125		******	
Arsenic	0.0981	0.00100	11	0.100	ND	98.1	75-125			
Beryllium	0.105	0.00100	11	0.100	ND	105	75-125			
Cadmium	0.0967	0.00100	11	0.100	ND	96.7	75-125			
Chromium	0.104	0.00100	11	0.100	ND	104	75-125			
Copper	0.106	0.00200		0.100	0.000710	105	75-125			
Lead	0.100	0.00100	**	0.100	0.000710	99.4	75-125			
Nickel	0.103	0.00200	10	0.100	0.000330 ND	103	75-125			
	. 0.103	0.00200		0.100	1417	103	13-143			

North Creek Analytical - Portland

Selenium

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0.0954

0.00100

0.100

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Project: MarineFin-1-01

14945 SW Sequoia Parkway, Suite 170

Project Number: na

Reported:

Portland, OR 97224

Project Manager: Paul Trone

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North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040749 - EPA 200/3005										
Matrix Spike (3040749-MS1)	Sou	rce: P3D05	19-01	Prepare	ed: 04/21/03	3 Analyz	ed: 04/22/0)3	*	
Silver	0.0493	0.00100	mg/l	0.0500	0.0000600	98.5	75-125		······································	
Thallium	0.0577	0.00100	11	0.0500	ND	115	75-125			
Zinc	0.0997	0.00500	11	0.100	ND	99.7	75-125			
Matrix Spike (3040749-MS2)	Sou	irce: P3D05	19-02	Prepare	ed: 04/21/0	3 Analyz	ed: 04/22/0)3		
Antimony	0.0469	0.00100	mg/l	0.0500	ND	93.8	75-125			
Arsenic	0.102	0.00100	n	0.100	0.00139	101	75-125	*		
Berylliùm	0.105	0.00100	#1	0.100	0.000140	105	75-125			
Cadmium	0.0983	0.00100	н	0.100	ND	98.3	75-125			
Chromium	0.104	0.00100	**	0.100	0.000810	103	75-125			
Copper	0.104	0.00200	. 44	0.100	0.000840	103	75-125			
Lead	0.100	0.00100	11	0.100	0.000400	99.6	75-125			
Nickel	0.104	0.00200	ni	0.100	ND	104	75-125			
Selenium	0.0935	0.00100	#	0.100	ND	93.5	75-125			
Silver	0.0517	0.00100	н	0.0500	0.00138	101	75-125			
Thallium	0.0560	0.00100	**	0.0500	0.000180	112	75-125			
Zinc	0.0991	0.00500	11	0.100	0.00146	97.6	75-125			

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Philip Nerenberg, Laboratory Manager

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14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported:

04/30/03 16:16

North Creek Analytical - Portland

	1101	th Citta	IMMEY	icai – i (JI CHAILU					
,		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

В	a	t	cI	h	3	U	4	U	ú	1	2	-	E	ľ	Ά	5	03	U.	В

Blank (3040612-BLK1)				Prepared & Analyzed: 04/17/03
Acetone	. ND	25.0	ug/l	
Benzene	ND	1.00	₩.,	
Bromobenzene	ND	1.00	**	
Bromochloromethane	ND	1.00	11	
Bromodichloromethane	ND	1.00	Ħ	
Bromoform	ND	1.00	**	
Bromomethane	ND	5.00	**	
2-Butanone	ND	10.0	**	
n-Butylbenzene	ND	5.00	, m	
sec-Butylbenzene	ND	1.00	. "	
tert-Butylbenzene	ND	1.00	11	
Carbon disulfide	ND	10.0	**	
Carbon tetrachloride	ND	1.00	n	
Chlorobenzene	ND	1.00	"	
Chloroethane	ND	1.00	11	
Chloroform	ND	1.00	11	
Chloromethane	ND	5.00	*	
2-Chlorotoluene	ND	1.00	11	
4-Chlorotoluene	ND	1.00	11	
1,2-Dibromo-3-chloropropane	ND	5.00	n	
Dibromochloromethane	ND	1.00	#	•
1,2-Dibromoethane	ND	1.00	n	
Dibromomethane	ND	1.00	11 -	
1,2-Dichlorobenzene	ND	1.00	*	
1,3-Dichlorobenzene	ND	1.00	#	
1,4-Dichlorobenzene	ND	1.00	*1	
Dichlorodifluoromethane	ND	5.00	Ħ	
1,1-Dichloroethane	ND	1.00	11	
1,2-Dichloroethane	ND	1.00	11	
1,1-Dichloroethene	ND	1.00	**	
cis-1,2-Dichloroethene	ND	1.00	'n	
trans-1,2-Dichloroethene	ND	1.00	11	
1,2-Dichloropropane	ND	1.00	**	
1,3-Dichloropropane	ND	1.00	"	
2,2-Dichloropropane	ND	1.00	н	
1,1-Dichloropropene	ND	1.00	11	

North Creek Analytical - Portland

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GeoDesign Project: MarineFin-1-01 14945 SW Sequoia Parkway, Suite 170 Project Number: na Reported: Portland, OR 97224 Project Manager: Paul Trone 04/30/03 16:16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040612 - EPA 5030B										
Blank (3040612-BLK1)				Prepare	d & Analy	zed: 04/1	7/03			
cis-1,3-Dichloropropene	ND	1.00	ug/l							
trans-1,3-Dichloropropene	ND	1.00	**							
Ethylbenzene	ND	1.00							1	
Hexachlorobutadiene	ND	2.00	#							
2-Hexanone	ND	10.0	**							
Isopropylbenzene	ND	2.00	11							
p-Isopropyltoluene	ND	2.00	н							
4-Methyl-2-pentanone	ND	5.00	11							
Methyl tert-butyl ether	ND	1.00	н							
Methylene chloride	ND	5.00	*							
Naphthalene	ND	2.00	**						•	
n-Propylbenzene	ND	1.00	**						*	
Styrene	ND	1.00	11							
1,1,1,2-Tetrachloroethane	ND	1.00	**							
1,1,2,2-Tetrachloroethane	ND	1.00	10							
Tetrachloroethene	ND	1.00	11							
Toluene	ND	1.00	н							
1,2,3-Trichlorobenzene	ND	1.00	n							
1,2,4-Trichlorobenzene	ND	1.00	**							
1,1,1-Trichloroethane	ND	1.00	**							
1,1,2-Trichloroethane	ND	1.00								
Trichloroethene	ND	1.00	н							
Trichlorofluoromethane	ND	1.00								
1,2,3-Trichloropropane	ND	1.00	11							
1,2,4-Trimethylbenzene	ND	1.00	π							
1,3,5-Trimethylbenzene	ND	1.00	н							
Vinyl chloride	ND	1.00	*							
o-Xylene	ND	1.00	n							
m,p-Xylene	ND	2.00	u							
Surr: 4-BFB	20.4		и	20.0		102	84.5-124		***************************************	
Surr: 1,2-DCA-d4	20.8		"	20.0		104	77.9-123			
Surr: Dibromofluoromethane	20.4		n	20.0		102	83.5-119			
Surr: Toluene-d8	19.3		"	20.0		96.5	84.1-116			

North Creek Analytical - Portland Philip Nevemberg

Philip Nerenberg, Laboratory Manager

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported:

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	Zinie Edin	in anishi	dains.	Mediga	8260B	Official	yktonik			
	Nort	h Creek	Analyt	ical - Po	ortland					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040612 - EPA 5030B										
LCS (3040612-BS1)				Prepare	d & Analy	zed: 04/1	7/03		*	
Benzene	20.1	1.00	ug/l	20.0	-	100	80-120			
Chlorobenzene	20.4	1.00	**	20.0		102	80-120			
1,1-Dichloroethene	20.5	1.00	н	20.0		102	80-120			
Toluene	20.2	1.00	Ħ	20.0		101	80-120			
Trichloroethene	20.6	1.00	11	20.0		103	80-124		Ē	
Surr: 4-BFB	20.6		"	20.0		103	84.5-124			
Surr: 1,2-DCA-d4	20.9		"	20.0		104	77.9-123			
Surr: Dibromofluoromethane	21.1		"	20.0		106	83.5-119			
Surr: Toluene-d8	20.7		"	20.0		104	84.1-116			
Matrix Spike (3040612-MS1)	Sou	rce: P3D050	06-01	Prepare	d & Analy	zed: 04/1	7/03			
Benzene	20.7	1.00	ug/l	20.0	ND	104	80-124			
Chlorobenzene	20.5	1.00	#	20.0	ND	102	72.9-134			
1,1-Dichloroethene	22.0	1.00	**	20.0	ND	110	79.3-127			
Toluene	20.7	1.00	11	20.0	0.410	101	79.7-131			
Trichloroethene	19.8	1.00	11	20.0	ND	99.0	68.4-130			
Surr: 4-BFB	20.2		"	20.0		101	84.5-124			
Surr: 1,2-DCA-d4	21.0		n	20.0		105	77.9-123			
Surr: Dibromofluoromethane	21.5		"	20.0		108	83.5-119			
Surr: Toluene-d8	20.4		"	20.0		102	84.1-116			
Matrix Spike Dup (3040612-MSD1)	. Sou	rce: P3D05	06-01	Prepare	ed & Analy	yzed: 04/1	7/03			
Benzene	20.8	1.00	ug/l	20.0	ND	104	80-124	0.482	25	
Chlorobenzene	20.5	1.00	**	20.0	ND	102	72.9-134	0.00	25	
1,1-Dichloroethene	21.7	1.00	**	20.0	ND	108	79,3-127	1.37	25	
Toluene	20.8	1.00	#	20.0	0.410	102	79.7-131	0.482	25	
Trichloroethene	20.0	1.00	**	20.0	ND	100	68.4-130	1.01	25	
Surr: 4-BFB	20.1		"	20.0		100	84.5-124			
Surr: 1,2-DCA-d4	20.5		"	20.0		102	77.9-123			
Surr: Dibromofluoromethane	21.9		. "	20.0		110	83.5-119			
Surr: Toluene-d8	20.7		,,	20.0		104	84.1-116			

North Creek Analytical - Portland

Philip Nerenberg, Laboratory Manager

Philip Nevemberg

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GeoDesign

Project: MarineFin-1-01

14945 SW Sequoia Parkway, Suite 170

Project Number: na

Reported:

Portland, OR 97224

Project Manager: Paul Trone

04/30/03 16:16

A Service Mark Contyniquents	Sometic	Compoun	il vije si	J. (V:04)	iñiÈir		in//Con	raides		(4) (4)
		th Creek			ortland	Control Statement of Maria				5- Libid 2- 1 Li 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1-
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040772 - EPA 3520/600 Series										
Blank (3040772-BLK1)				Prepare	d: 04/22/0	3 Analyz	ed: 04/28/0	03		
Acenaphthene	ND	0.100	ug/l				·			
Acenaphthylene	ND	0.100	. 11							
Anthracene	ND	0.100	н							
Benzo (a) anthracene	ND	0.100	11							
Benzo (a) pyrene	ND	0.100	n		•					
Benzo (b) fluoranthene	ND	0.100	#							
Benzo (ghi) perylene	ND	0.100	ti .					*		
Benzo (k) fluoranthene	ND	0.100	Ħ							
Chrysene	ND	0.100	n .							
Dibenzo (a,h) anthracene	ND.	0.200	Ħ			•				
Fluoranthene	ND	0.100	n .							
Fluorene	ND	0.100	11							
Indeno (1,2,3-cd) pyrene	ND	0.100	· n							
Naphthalene	ND	0.100	•							
Phenanthrene	ND	0.100	**							
Pyrene	ND	0.100	**							
Surr: Fluorene-d10	2.18		"	2.50		87.2	25-125		*	
Surr: Pyrene-d10	2.26		rr .	2.50		90.4	23-150			
Surr: Benzo (a) pyrene-d12	2.24		"	2.50		89.6	10-125			
LCS (3040772-BS1)				Prepare	d: 04/22/0)3 Analyz	ed: 04/28/	03		
Acenaphthene	1.80	0.100	ug/l	2.50		72.0	26-135			
Benzo (a) pyrene	1.81	0.100	U.	2.50		72.4	38-137	•		
Pyrene	2.00	0.100	n	2.50		80.0	33-133			
Surr: Fluorene-d10	2.00		"	2.50		80.0	25-125			
Surr: Pyrene-d10	2.11		"	2.50		84.4	23-150			
Surr: Benzo (a) pyrene-d12	1.98		"	2.50		79,2	10-125			

North Creek Analytical - Portland

Philip Nerenberg, Laboratory Manager

Philip Nevenberg

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

Project Manager: Paul Trone

Reported:

04/30/03 16:16

·	No	rth Creek	Analyt	ical - Po	ortland					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040772 - EPA 3520/600 Series										
LCS Dup (3040772-BSD1)				Prepare	d: 04/22/0	3 Analyz	ed: 04/28/0)3		
Acenaphthene	1.69	0.100	ug/l	2.50		67.6	26-135	6.30	60	
Benzo (a) pyrene	1.75	0.100	11	2.50		70.0	38-137	3.37	60	
Pyrene	1.77	0.100	17	2.50		70.8	33-133	12.2	60	
Surr: Fluorene-d10	1.94		" .	2.50		77.6	25-125			
Surr: Pyrene-d10	1.95		"	2.50		78.0	23-150			
Surr: Benzo (a) pyrene-d12	2.03		"	2.50		81.2	10-125			

North Creek Analytical - Portland

Philip Nevemberg

Philip Nerenberg, Laboratory Manager

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Page 20 of 21

GeoDesign Project: MarineFin-1-01
14945 SW Sequoia Parkway,Suite 170 Project Number: na Reported:
Portland, OR 97224 Project Manager: Paul Trone 04/30/03 16:16

Notes and Definitions

Q-06 Analyses are not controlled on RPD values from sample concentrations less than 5 times the reporting limit.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.

wet Sample results reported on a wet weight basis (as received)

RPD Relative Percent Difference

Philip Merenberg

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Philip Nerenberg, Laboratory Manager

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PHASE II ENVIRONMENTAL SITE ASSESSMENT

Marine Finance Corporation

8444 NW St. Helens Road Portland, Oregon

For Marine Finance Corporation c/o Digital Video Systems June 16, 2003

GeoDesign Project: MarineFin-1-01-05

GEO DESIGNE

14945 SW Sequoia Pkwy - Suite 170 ! Portland OR 97224 off 503.968.8787 ! Fax 503.968.3068

June 16, 2003

Marine Finance Corporation c/o Digital Video Systems 1731 Technology Drive, Suite 810 San Jose, CA 95110

Attention: Mr. Doug Watson

Phase II Environmental Site Assessment

Marine Finance Corporation Facility 8444 NW St. Helens Road Portland, Oregon GeoDesign Project: MarineFin-1-01-05

GeoDesign, Inc. is pleased to submit our Phase II Environmental Site Assessment for the Marine Finance Corporation Facility located at 8444 NW St. Helens Road in Portland, Oregon. Contractual terms for our services are contained in our proposal dated February 20, 2003.

We appreciate the opportunity to be of service to you. Please contact us if you have questions regarding this report.

Paul Trow

Sincerely,

GeoDesign, Inc.

Robert E. Belding, R.G.

Principal Geologist

cc: Mr. Gordon Carey

Mr. Mark Pugh, Oregon Department of Environmental Quality

SGR:PMT:REB:kt

Attachments

One copy submitted

Document ID: Phase II 060603.envr.doc

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Appendix C

Jacobs Engineering Group Inc., Sample Location Map (3-1)

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Jacobs Engineering Group Inc., Sediment Analytical Results Map (4-5)

1.0 INTRODUCTION

This report summarizes the results of our Phase II Environmental Site Assessment (ESA) for the property located at 8444 NW St. Helens Road in Portland, Oregon. The approximate 9.7-acre property is composed of the land immediately surrounding the western side of St. Johns Bridge on the Willamette River. The Phase II ESA consisted of a subsurface investigation; soil sampling; groundwater well installation; and monitoring for diesel hydrocarbons, volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and 13 priority pollutant total metals. This Phase II ESA was conducted to address environmental concerns identified during exploratory sampling activities that resulted in an Expanded Preliminary Assessment (XPA), performed by Jacobs Engineering in November 2000, for the subject property. The scope of work was conducted in accordance with our proposal dated February 20, 2003. The site and surrounding physical features are shown in Figure 1. The site layout and locations of soil borings and monitoring wells on the site are shown in Figure 2.

2.0 BACKGROUND

In fall of 1997 the U.S Environmental Protection Agency (EPA) contracted Weston for the collection of 187 near-shore sediment samples along the Portland Harbor Area. Three sediment samples were collected adjacent to the site. This exploratory sampling project identified contaminated sediments in two of the samples adjacent to the site. Contaminant concentrations exceeding either the Oregon Department of Environmental Quality (DEQ) Ecological Risk Assessment Screening Level Value (SLV) or Portland Harbor Baseline Value included arsenic, cadmium, copper, lead, manganese, mercury, nickel, zinc, 2-methylnaphthalene, 4-methylphenol, benzoic acid, benzyl alcohol, butylbenzylphthalate, carbazole, di-N-butylphthlate, di-N-octylphthalate, dibenzofuran, dimethylphthalate, pentachlorophenol, phenol, PAHs, and polychlorinated biphenyls.

Following the EPA sampling event, the DEQ contracted Jacobs Engineering (Jacobs) to perform an XPA for the subject area in order to further analyze the extent of contamination around the western side of St. Johns Bridge. Jacobs collected 7 samples from direct-push borings, 11 surface soil samples, 9 sediment samples, and 2 surface water samples (See Appendix C for sample locations and results). Laboratory analyses for groundwater reported concentrations above EPA Region 9 Preliminary Remediation Goals (PRGs) for chloroform, benzo(a)pyrene, chrysene, indeno(1,2,3-cd)pyrene, antimony, arsenic, iron, lead, and manganese. Laboratory analyses for surface water reported concentrations of barium above the PRG. Laboratory analysis of surface soil samples (6-inch depth) reported concentrations above the PRG for benzo(a)pyrene, arsenic, and chromium. Laboratory analysis of subsurface soil samples reported concentrations of arsenic above the PRG. Laboratory analysis of sediment samples reported concentrations above SLVs or Portland Harbor Baseline Values for PAHs, 2-methylnaphthalene, dibenzofuran, butylbenzylphthalate, arsenic, copper, lead, mercury, and zinc.

DEQ prepared a Site Assessment Program-Strategy Recommendation Letter (December 12, 2002) in response to the XPA provided by Jacobs. The letter described specific data gaps to be addressed on the project site. GeoDesign has addressed these data gaps for the upland portion of the site in the scope of work completed for this Phase II ESA.

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MarineFin-1-01-05:061603

3.0 SCOPE OF WORK

The DEQ's December 12, 2002 letter provided a general scope of work to complete the characterization of the uplands portion of the site. The scope of work does not address river sediments adjacent to the Marine Finance site. We understand that the DEQ will refer the site to the EPA to address in-water issues during the proposed harbor-wide remedial investigation. The DEQ scope of work for the upland portion of the site includes the following:

- Soil sampling from at least two discrete depth intervals at locations with the highest contaminant levels in surface soil as determined by environmental sampling conducted by Jacobs (SS-2, SS-7, and SS-9) and from the former underground storage tank (UST) location (Figure 2).
- Installation and quarterly monitoring (one-year minimum) of approximately six monitoring
 wells across the eastern side of the property to assess shallow groundwater contaminants
 potentially discharging to the Willamette River, as well as flow direction and gradient.
- Collection of additional surface soil samples at approximately 10 locations to better define the lateral extent of surface soil contamination (not addressed in this study).

DEQ noted, "based on the results of the further investigation, DEQ will determine whether additional actions are necessary to assure protection of human health or the environment."

GeoDesign's completed scope of work addressed DEQ's first two bullet items noted above. The type and number of chemical analyses that were conducted are based on the results of the XPA and the DEQ's strategy recommendation. Those tasks that are deemed less time sensitive and dependent on the results of the first phase of sampling will be saved for a later phase, including surface soil sampling and analysis. The work scope includes only two quarters of groundwater sampling events, the first of which is presented in this report. The need for two additional rounds of groundwater sampling will be evaluated after the first two rounds of groundwater sampling have been completed. The five work tasks completed during the current study are described below. Further detail regarding the following tasks can be reviewed in GeoDesign's Work Plan, dated March 24, 2003.

TASK 1: DATA EVALUATION AND WORK PLAN PREPARATION

GeoDesign developed a subsurface investigation work plan based on the results of the XPA and DEQ's strategy recommendation. The work plan included soil and groundwater sampling rationale, a table of proposed chemical analyses, and a map of proposed boring/well locations. The work plan, dated March 24, 2003, was submitted to DEQ for final approval prior to conducting the investigation.

TASK 2: PRE-FIELD ACTIVITIES

GeoDesign conducted the following pre-field activities preparatory to the investigation.



- Conduct a preliminary site visit to select and mark the boring locations.
- Contact the one-call utility notification center to coordinate the locating of underground utilities beneath the site prior to beginning the subsurface explorations.
- Prepare a site-specific Health and Safety Plan checklist as required by hazardous waste operations rules outlined in 29 CFR 1910.120.

TASK 3: BORINGS AND MONITORING WELL INSTALLATION

GeoDesign performed a subsurface investigation, consisting of the following subtasks:

- Subcontract Geo-Tech Explorations of Tualatin, Oregon, to advance two Geoprobe® borings to depths of 9 and 20 feet below the ground surface (bgs), respectively, and six monitoring well borings to a depth of approximately 30 feet bgs.
- Obtain continuous soil samples from the borings for field screening and possible chemical analysis.
- Screen soil samples in the field using visual, water sheen, and headspace vapor screening techniques.
- Based on field screening results, collect soil samples for laboratory analysis from the 20- and 9-foot Geoprobe® soil borings (drilled near SS-2 and SB-4) and two of the 30-foot monitoring well borings (drilled near SS-7/SW-2 and SS-9/SW-1) at two discrete depth intervals. Submit the samples to North Creek Analytical (NCA) of Beaverton, Oregon, for laboratory analysis, including diesel-range petroleum hydrocarbons by NWTPH-Dx (8), VOCs by EPA Method 8260B (2), PAHs by EPA Method 8270C-SIM (8), and 13 priority pollutant metals by EPA Method 6010B/7000 series (4).
- Collect one soil sample from the groundwater interface in each of the remaining four monitoring well borings (drilled near SS-10/GW-6, GW-5, SS-11/GW-7, and GW-2) and submit the samples for laboratory analysis, including PAHs by EPA Method 8270C-SIM (4), VOCs by EPA Method 8260B (1), and 13 priority pollutant metals by EPA Method 6010B/7000 series (4).
- Observe the installation of six 1.5-inch-diameter groundwater monitoring wells in the 30-foot borings. Complete each well with 15 feet of pre-packed screen with either a flushmount, traffic rated monument or an aboveground locking monument surrounded by guard posts.
- Backfill the temporary borings with bentonite, and repair the surface to match existing grade.
- Develop the six monitoring wells through pumping.
- Coordinate the disposal of soil cuttings, drilling decontamination water, and well purge water.

TASK 4: SURVEY WELLS AND QUARTERLY GROUNDWATER MONITORING

Subcontract a well survey and perform two quarters of groundwater monitoring as follows:

- Subcontract a licensed surveyor to establish the x, y coordinates and top of casing elevations of the six monitoring wells.
- Perform two rounds of groundwater monitoring of the six monitoring wells, e.g. in March and June 2003 (on a quarterly schedule) or March and September 2003 (on a semi-annual schedule).

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- Once each event, measure depth to water in each of the wells to the nearest 0.01 foot using a water level indicator.
- Once each event, purge at least three casing volumes of groundwater using a peristaltic pump. Monitor pH, conductivity, and temperature.
- Once each event, collect a representative groundwater sample from each of the six wells using a new length of sample tubing fitted with a ball foot check valve. Transfer the samples to laboratory prepared sample containers. Submit samples under chain or custody procedures to NCA for analysis of VOCs by EPA Method 8260B (2), PAHs by EPA Method 8270C (6), and 13 priority pollutant metals (totals) by EPA Method 6010B/7000 series (6). A total of 8 groundwater samples would be analyzed each quarter, including 2 quality assurance/quality control samples. The total number of samples for the two quarters is 16.

The need for two additional quarters of groundwater monitoring will be determined in consultation with DEQ based on the results of the first two rounds of groundwater sample analysis.

TASK 5: REPORTS AND MEETING

Reports will be prepared summarizing the results of subsurface investigation as well as two quarterly groundwater monitoring events.

- The report of the investigation would include a description of the methods used, summary of subsurface conditions encountered, and evaluation of the analytical data. Soil boring logs, well as-built diagrams, a site plan showing boring/well locations, analytical reports, and chain of custody documents will be included.
- The results of the first groundwater monitoring event would be reported along with the
 results of the drilling investigation. Subsequent monitoring events would be reported
 separately. Each report would include a summary of methods, conditions encountered, and
 an analysis of the data. A groundwater contour map, field report, analytical report, and chain
 of custody documents also would be included.
- Present the results of the investigation and first groundwater monitoring event to the client during a meeting.

ADDITIONAL TASKS

GeoDesign proposes to conduct surface soil sampling during a subsequent phase to assist with soil management decisions when developing the site. Surface soil samples would be collected at approximately 10 locations using a hand auger, and the samples would be submitted for laboratory analysis. The specific scope of work and costs for surface soil sampling and analysis would be presented at a later date under separate cover.

4.0 SITE DESCRIPTION AND PHYSICAL SETTING

The subject property is located northwest of the city of Portland, beneath the southwestern end of the St Johns Bridge, on the western side of the Willamette River. The approximately 9.7-acre site is composed of Tax Lots 100, 500, and 600 in the southeast quarter of Section 11, Township

1N, Range 1W of the Willamette Meridian. The site is occupied by multiple tenants, including Transversal (Transloader) International Corporation, Hendren Tow Boat Company, Blackcat Studios, and Superior Performance (Figure 2).

SITE GEOLOGY AND HYDROGEOLOGY 5.0

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The Marine Finance site is located on the western bank of the Willamette River with surface topography sloping gently toward the waterfront. General surficial site geology consists of fill material, native Willamette River terrace deposits, and native Willamette River Basin alluvium. Records of fill suggest that the material was brought to the site in two or more stages, and the fill was most likely obtained from private dredging operations. The native soil deposits are Pleistocene Age and consist of stratified sands and silt. The terrace deposits tend to be nearly indistinguishable from the alluvium. However, the terrace deposits are known to be approximately 10 feet in thickness while the alluvium can be up to 100 feet thick (Trimble, 1957). Underlying the surficial sediments and fill are Columbia River Basalts, poorly sorted lacustrine deposits, and the Pliocene Troutdale Formation.

Groundwater and surface water are believed to flow east, toward the Willamette River. In addition, a groundwater seep or spring located near the northern end of the property also flows toward the river. Local alluvium was deposited into Willamette and Columbia river floodplains. Aquifers in floodplain deposits generally are unconfined and localized due to the heterogeneity of the deposits (Jacobs Engineering, 2000).

SEEP OF

SUBSURFACE INVESTIGATION RESULTS 6.0

GeoDesign's investigation included advancing direct push Geoprobe® borings B-1 and B-2 to a depth of 20.0 and 9.0 feet bgs, respectively; advancing six direct push monitoring well borings (MW-1 through MW-6) to depths ranging from 19.5 to 30 feet bgs; obtaining soil samples for laboratory analysis; and constructing six monitoring wells (MW-1 through MW-6) in the boreholes. Drilling services were provided by Geo-Tech Explorations, Inc. of Tualatin, Oregon. These activities were conducted to evaluate the potential for impact to soil and groundwater from the documented contamination discussed in Section 2.0 and shown on Jacob's figures in Appendix C. The results of the characterization activities are presented in the following sections. The boring and monitoring well locations are shown in Figure 2. The boring logs are included in Appendix A

SOIL SAMPLING 6.1

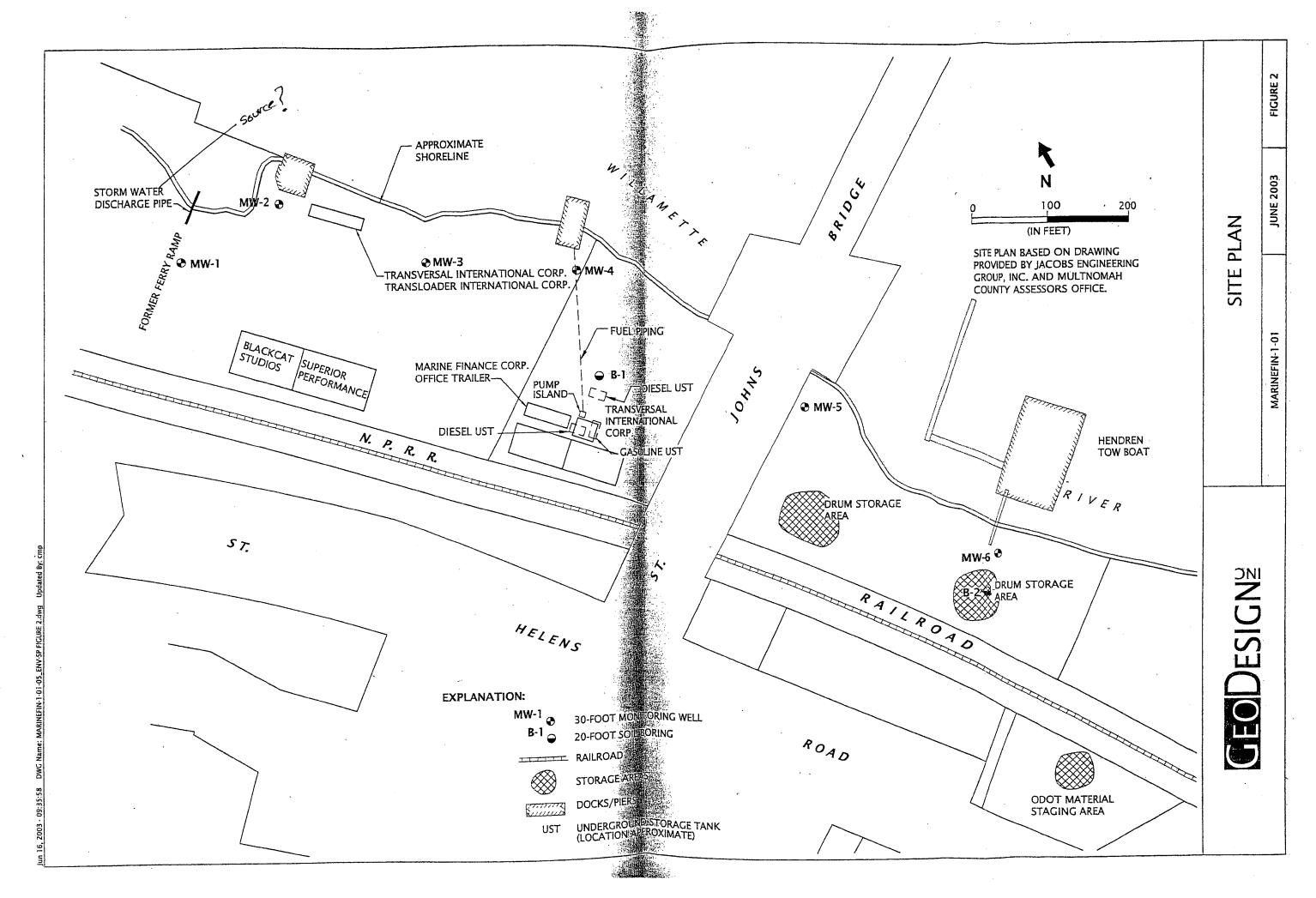
On April 13, 2003, soil samples were obtained continuously from each boring for field screening and classification. A portion of each sample was field-screened for potential VOCs using a photoionization detector (PID) and visual methods. Surface and subsurface soils consisted generally of moist, brown to gray silty sand with occasional gravels. Fill material is present across the entire site and ranges in depth from 9 to 30 feet bgs, according to our boring logs. The fill material is underlain by gray to brown sand and sandy silt with trace organics. Boring B-1, a 20-foot boring, encountered fill material to a depth of 1.8.5 feet bgs. The soil appeared wet at 17 feet bgs, and the soil graded from sand to silt below a depth of 18.5 feet bgs. Boring B-2, a 9-foot boring, was entirely in fill material, and the silty sand fill became wet at 7 feet.

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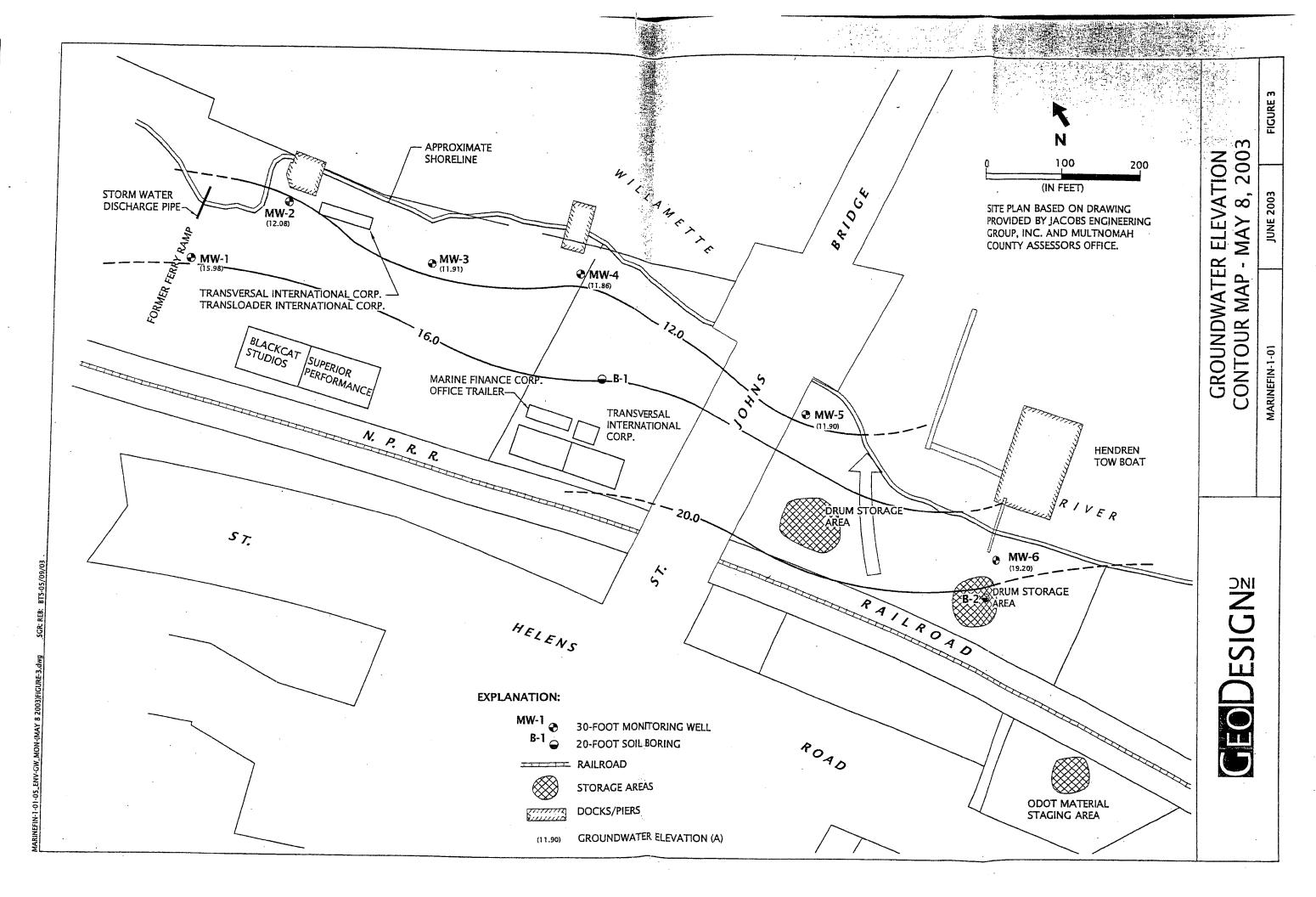


TABLE 1 Groundwater Elevation Data Marine Finance Corporation Site Portland, Oregon

Well ID	Date	Top of Casing Elevation (feet above MSL)	Depth to Water (feet)	Groundwater Elevation (feet above MSL)
MW-1	05/08/03	22.93	6.95	15.98
MW-2	05/08/03	31.63	19.55	12.08
MW-3	05/08/03	31.96	20.05	11.91
MW-4	05/08/03	31.56	19.70	11.86
MW-5	05/08/03	31.85	19.95	11.90
MW-6	05/08/03	30.95	11.75	19.20

Notes:

-: not applicable MSL: mean sea level

TABLE 2 Summary of Subsurface Soil Analytical Data Petroleum Hydrocarbons and Total Metals Marine Finance Corporation Site Portland, Oregon

Sample I.D.	(feet) NW I PH-DX Method NW I PH-DX Met					Total Metals by EPA Method 6000/7000 Series (mg/Kg)											TCLP Metals by EPA Method 1311/6000/7000 Series	
		(feet)	(mg/Kg)	(mg/Kg)	Antimony (mg/Kg)	Arsenic (mg/Kg)	Beryllium (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Lead (mg/Kg)	Mercury (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Silver (mg/Kg)	Thallium (mg/Kg)	Zinc (mg/Kg)	Lead (mg/L)
B-1 (8-10)	03/24/03	8-10	ND<25.0	ND<50.0	ND<0.500	2.42	0.376	ND<0.370	13.2	15.9	4.73	ND<0.100	17.9	ND<0.370	ND<0.500	ND<0.500	62.8	-
B-1 (17-18)	03/24/03	17-18	ND<25.0	ND<50.0		_					_	_			-	-		-
B-2 (7-9)	03/24/03	7-9	ND<25.0	ND<50.0	8.99	2.27	0.375	5.39	16.4	17.1	5.82	ND<0.0893	18.5	ND<0.305	ND<0.355	ND<0.355	92.4	-
MW-1 (8-9)	03/21/03	8-9	ND<25.0	57.6	ND<0.500	1.66	0.742	ND<1.95	22.9	18.3	10.5	ND<0.100	13.6	ND<0.321	ND<0.500	ND<0.500	55.8	ND<0.100
MW-1 (14-15)	03/21/03	8-9	ND<25.0	ND<50.0	-	-			_	-			-	_	_		- .	
MW-2 (18-20)	03/21/03	18-20	ND<25.0	ND<50.0	ND<0.309	2.31	ND<0.431	ND<0.431	14.2	35.7	4.04	ND<0.0862	16.9	ND<0.431	ND<0.309	ND<0.309	63.6	_
MW-2 (23-25)	03/21/03	18-20	ND<25.0	ND<50.0					_	-		_	-	<u> </u>		-		-
MW-3 (19-20)	03/21/03	19-20			ND<0.329	2.91	ND<0.397	ND<0.397	13.2	16.8	2.24	ND<0.0893	17.0	ND<0.397	ND<0.329	ND<0.329	51.0	
MW-4 (18-19)	03/21/03	18-19	31.0	66.1	ND<0.350	2.67	0.298	ND<0.286	11.3	17.5	7.78	0.182	15.7	ND<0.286	ND<0.350	ND<0.350	52.8	ND<0.100
MW-5 (22-23)	03/21/03	22-23			ND<0.397	1.76	ND<0.394	ND<0.394	19.2	20.0	5.92	ND<0.100	23.4	ND<0.394	ND<0.397	ND<0.397	58.2	
MW-6 (13-15)	03/21/03	13-15			ND<0.329	1.97	ND<0.413	ND<0.413	15.9	18.6	11.1	ND<0.0862	21.3	ND<0.413	ND<0.329	ND<0.329	52.8	ND<0.100
DEQ Level I Soil M	Matrix Cleanup	Standards	100	100			-			-	-	_				-	-	
DEQ Generic RBC	S				_							<u>'</u>					***************************************	
Soil Ingestion, Der Occupational	mal Inhalation -			-	-			-	-	-	1,000	-	· <u></u>	***	-	_		-
Soil ingestion, Deri Worker	mal inhalation -	Excavation		-	-	-				-	1,000		-					
Soil Volatization to	Outdoor Air		·	-		-					NA						**	
Soil Vapor Intrustic	on into Building:	5	-	-				-			NA				-			
Soil Leaching to Gr					`	-					1.5				_			
DEQ Soil Leachate	Reference Cor	centration					-					_			-	_		2
EPA Region 9 PRG	is (Industrial)			••	410	1.6a	1,900	450	450	41,000	750	310	20000b	5,100	5,100	67	100,000	

Votes.

-: not analyzed

a - arsenic cancer endpoint

b - nickel soluble salts

DEQ: Oregon Department of Environmental Quality

EPA: U.S. Environmental Protection Agency

mg/Kg: milligrams per kilogram

NA: not applicable

ND: Not detected above laboratory reporting methods.

PRGs: preliminary remediation goals

RBCs: risk-based concentrations



TABLE 3 Summary of Subsurface Soil Analytical Data VOCs and PAHs Marine Finance Corporation Site Portland, Oregon

		,	·					 						•	
Sample I.D.	Date	Sample Depth (feet)	VOCs by EPA Method 8260B (µg/Kg)						PAHs i EPA Method (µg/K	8270SIM					T.
		(reet)	2-Chlorotoluene	Acenaphthene	Benzo- (a)anthracene	Benzo- (a)pyrene	Benzo- (b)fluoranthene	Benzo- (ghi)perylene	Benzo- (k)fluoranthene	Chrysene	Fluoranthene	Fluorene	Indeno- (1,2,3-cd)pyrene		Pyrene
B-1 (8-10)	03/26/03	8-10		45.3	104	114	72.8	91.6	71.2	139	310	ND≺26.8	66.9	144	327 72.8
B-1 (17-18)	03/26/03	17-18		ND<40.2	20.4	17.1	18.5	18.6	ND<13.4	24.6	76	14.2	ND<13.4	83.0	
B-2 (7-9)	03/24/03	7-9	266	ND<26.8	111	138	82.6	117	89.9	139	254	ND<26.8	82.3	ND<26.8	293 61.6
MW-1 (8-9)	03/21/03	8-9		ND<13.4	24.8	29.5	21.9	26.2	18.8	32.5	49.2	ND<13.4	19.2	42.8	ND<13.4
MW-1 (14-15)	03/21/03	14-15		ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	
MW-2 (18-20)	03/21/03	18-20	ND< 100	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4
MW-2 (23-25)	03/21/03	23-25	_	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4
MW-3 (19-20)	03/21/03	19-20		ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4
MW-4 (18-19)	03/21/03	18-19		15.9	43.4	59.7	35.5	62.6	41.5	55.6	51.5	14.3	43.2	27.0	102
MW-5 (22-23)	03/21/03	22-23		ND<13.4	35.4	57.9	32.4	57.9	34.8	47.3	88.8	ND<13.4	38.8	38.6	137
MW-6 (13-15)	03/21/03	13-15	ND< 100	ND<26.8	70.2	124	85.2	149	71.4	98.5	137	ND<26.8	100	60.7	169
DEQ Generic RBC				· · · · · · · · · · · · · · · · · · ·								·	,	T	
Soil Ingestion, Der Inhalation - Occup	mal Contact, a	nd		25,000,000a	2,700	270	2,700		27,000a	270,000a	29,000,000a	23,000,000a	2,700a	-	21000000a
<u> </u>				110,000,000a	270,000a	27,000a	2,700,000a		2,700,000a	27,000,000a	110,000,000a	94,000,000a	270,000a	<u></u> ·	84000000a
Soil Ingestion - Exc				100,000,000a	19,000b	8,300b	9,200b		4,900b	3,200b	110,000b	140,000b	380b		71 000b
Volatilization to O				100,000b	19,000b	8,300b	9,200b	_	4,900b	3,200b	110,000b	140,000b	380b		71000b
Vapor Intrusion int						5,200b	9,200b		4,900b	3,200b	110,000b	140,000b	380b		71 000b
Soil Leaching to Gr				100,000b 29,000,000	19,000b 2,100	210	2,100		21,000	210,000	22,000,000	26,000,000	2,100		29,000,000
EPA Region 9 Indi	ustriai PKGS ir	1 2011		29,000,000	2,100	210	2,100	L	J		 				,

Notes:

-: not analyzed/applicable

a: >Csat. The soil RBC exceeds three-phase equilibrium partitioning. Soil concentrations in excess of Csat indicate that free product may be present.

b: =Csat. This number is not a risk-based concentration

DEQ: Oregon Department of Environmental Quality

EPA: U.S. Environmental Protection Agency

mg/Kg: milligrams per kilogram

ND: Not detected above laboratory reporting methods.

PAHs: polynuclear aromatic hydrocarbons
PRG: preliminary remediation goal

RBCs: risk-based concentrations

µg/Kg: microgram per kilogram VOCs: volatile organic compunds

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TABLE 4 Summary of Groundwater Analytical Data Total Metals Marine Finance Corporation Site Portland, Oregon

Sample I.D.	Sample Date							Total Metals thod 6000/7000 (mg/L)		·				
·		Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
MW-1	04/15/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00500
MW-2	04/15/03	ND<0.00100	0.00139	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	ND<0.00100	0.00138	ND<0.00100	ND<0.00500
MW-3	04/15/03	ND<0.00100	0.0012	ND<0.00100	ND<0.00100	0.00183	0.00218	0.00117	ND<0.000200	0.00413	ND<0.00100	ND<0.00100	ND<0.00100	0.00774
MW-4	04/15/03	. 0.001-01	0.0195	0.00357	0.00202	0.182	0.43500	0.692	0.000973	0.139	0.00103	0.01490	ND<0.00100	0.63500
MW-5	04/15/03	ND<0.00100	0.00286	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	0.00119	ND<0.00100	ND<0.00100	ND<0.00500
MW-6	04/15/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	0.00227	0.00173	ND<0.000200	0.00303	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00500
DEQ Generic RBCs	5						* * * * * * * * * * * * * * * * * * * *		·					
Groundwater Inges	tion - Occupational	_						0.015			-			
cological Risk, Aq	uatic	1.6	0.15	0.0053	0.0022	0.011	0.009	0.0025	0.00077	0.052	0.005	0.00012	0.04	0.12
EPA Region 9 Tap	Water PRGs	0.015	0.000045	0.073	0.018	55*	1.5		0.011	0.73**	0.18	0.18	0.024	11

Notes:

*: Chromium iii

**: Soluble Salts

-: not analyzed/applicable

DEQ: Oregon Department of Environmental Quality

EPA: U.S. Environmental Protection Agency

mg/L: milligrams per liter

ND: Not detected above laboratory reporting methods.

RBCs: risk-based concentrations PRG: preliminary remediation goal



TABLE 5
Summary of Groundwater Analytical Data
PAHs and VOCs
Marine Finance Corporation Site
Portland, Oregon

Sample I.D.	Date	PAHs by EPA Method 8270SIM (µg/L)										
·		Acenaphthene	Benzo- (ghi) perylene	Chrysene	Fluoranthene	Naphthalene	Phenanthrene	Pyrene	Others	All		
MW-1	04/15/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND			
MW-2	04/15/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND	ND		
MW-3	04/15/03	0.490	ND<0.100	ND<0.100	0.795	ND<0.100	0.117	1.11	ND			
MW-4	04/15/03	0.808	0.100	0.113	0.168	0.135	0.134	0.649	ND			
MW-5	04/15/03	0.196	ND<0.100	ND<0.100	0.134	ND<0.100	0.277	0.666	ND			
MW-6	04/15/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND	ND		
DEQ Generic RBCs								· · · · · · · · · · · · · · · · · · ·	<u> </u>	<u> </u>		
Groundwater Ingestion - Oc	cupational	2,700	••	17a	1,800a	890		1,300a	Varies			
Volatilization to Outdoor A	ir - Occupational	4,200b		2b	210b	31,000b		140b	Varies			
Vapor Intrusion Into Buildir	ngs - Occupational	4,200b		2b	210b	31,000Ь		140b	Varies			
Ingestion and Inhalation fro Occupational	om Tap Water -	620				8.7			Varies			
Groundwater in Excavation Worker	- Excavation	4,200b		2b	210Ь	240b		140b	Varies			
Ecological Risk, Aquatic		0.52		••	0.00616	0.62	0.0063					
EPA Region 9 Tap Water P	RGs	370		9.2	1,500	6.2		180	Varies			

Notes:

- --: not analyzed/applicable
- a: >5. This groundwater RBC exceeds the solubility limit. Groundwater concentrations in excess of S indicate that free product may be present.
- b: =S. This number is not a risk-based concentration.
- DEQ: Oregon Department of Environmental Quality
- EPA: U.S. Environmental Protection Agency
- ND: Not detected above laboratory reporting methods.
- PAHs: polynuclear aromatic hydrocarbons
- PRG: preliminary remediation goal
- RBCs: risk-based concentrations
- µg/L: micrograms per liter
- VOCs: volatile organic compunds



TABLE 6 Summary of Regional Naturally-occurring Arsenic Concentrations Marine Finance Corporation Site Portland, Oregon

Media	Location	Sample Population		enic Concentra (mg/Kg or µg/l	Reference	
		1 opulation	Median	Low	High	
	Mears Trust Site, Beaverton	11	3.7	0.5	5.2	GeoDesign, 2000
	Sexton Mountain, Beaverton	45	3.2	0.1	7.1	GeoDesign, 2001
	Oregon, State-wide				10.0	Baldwin and McCreary, 1998
Soil	Oregon, State-wide	34	5.1	1.2	10.3	Shacklette and Boerngen, 1984
3011	Clark County, Washington		5.8	·		Juan, 1994
	The Round, Beaverton	19	6.2	1.1	36.5	Squier, 1993; Squier, 1995; URS, 2002
	Durham Quarry, Tigard	7	<2.00	<1.85	<2.00	GeoDesign, 2003
	On Site	8	2.29	1.66	2.91	This Study
Sediment.	Tualatin River Subbasin	22	7.2	2.0	16.0	Bonn, 1999
Surface Water	Tualatin River Subbasin	1,140	3.0			DEQ, 2001
	Mears Trust Site, Beaverton	7	38.6	1.6	115	GeoDesign, 2000
	Sexton Mountain, Beaverton	15	8.8	2.0	19.3	GeoDesign, 2001
	Willamette Basin	728	68.3	<1	2,000	Hinkle and Pollette, 1999
Groundwater	Tualatin River Subbasin			<1	77	Hinkle and Pollette, 1999
	The Round, Beaverton	7	50.6	2.5	186	URS, 2002
	Durham Quarry, Tigard	3	2.33	1.83	4.16	GeoDesign, 2003
	On Site	6	1.3	1.0	19.5	This Study

Notes:

--: not applicalble/available

mg/Kg: milligrams per kilogram. Applies to soil and sediment concentrations.

μg/L: micrograms per liter. Applies to surface water and groundwater concentrations.



APPENDIX A

SUBSURFACE EXPLORATIONS.

Geoprobe® explorations were completed at the site on April 4, 2003. The explorations were completed using a direct push technology drill rig owned and operated by Geo-Tech Explorations of Tualatin, Oregon. The approximate push probe boring locations are shown on Figure 2.

A GeoDesign field representative observed the explorations and obtained soil samples from all of the push probe borings. The soils encountered in the Geoprobe® borings were visually classified in general accordance with guidance provided in American Society for Testing and Materials D 2488.

SOIL SAMPLING

Soil samples were obtained continuously from the borings using a 5-foot driven tube with a plastic liner. The sampler was driven inside the drill casing and soil samples were removed at the completion of the 5-foot section. A portion of each sample was used for field screening. Another portion of each sample was immediately placed in laboratory prepared glass jars with Teflon-lined lids. The jars were packed full to eliminate headspace in the containers. The soil samples were immediately placed in a cooler with ice and were transferred to the GeoDesign refrigerator pending groundwater analytical results. Chain-of-custody procedures were followed during handling and transport of the samples.

The equipment used for soil sampling was cleaned between each boring location with a detergent wash and a tap water rinse. The GeoDesign representative wore new nitrile gloves during sample collection procedures.

SOIL SAMPLE FIELD SCREENING METHODS

The GeoDesign field representative performed field-screening tests on portions of the soil samples obtained from the borings. Field screening results are used as a field method to identify possible contamination in soil samples and to aid in selection of soil samples for chemical analysis. The field screening methods used included visual examination and headspace vapor screening using a hand-held Mini Rae Model PGM-76IS PID.

Visual screening typically involves inspecting the soil sample for visual indications of petroleum contamination, such as staining. Visual screening is typically more effective when soil samples are heavily contaminated, which generally results in staining.

Headspace vapor screening consists of placing a soil sample in a plastic bag and capturing air in the bag. The bag is then sealed and shaken to expose the atmosphere in the bag to VOCs in the soil. The PID intake probe is then inserted into the bag to measure the concentration of VOCs in the bag headspace.



A-1

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SYMBOL	SOIL DESCRIPTION		
O I MIDOL	SOIL DESCRIPTION		
	Location of sample obtained in genera Test with recovery	l accordance wit	h ASTM D 1586 Standard Penetration
Section of the sectio	Location of sample obtained using thir accordance with ASTM D 1587 with rec	n wall, shelby tub covery	oe, or Geoprobe® sampler in general
	Location of sample obtained using Dar with recovery	nes & Moore sar	mpler and 300-pound hammer or pushe
X	Location of grab sample		
	Rock coring interval		
$\underline{\nabla}$	Water level during drilling		
<u>*</u>	Water level taken on date shown		
OTECHN	ICAL TESTING EXPLANATIONS		
PP	Pocket Penetrometer	SIEV	Sieve Gradation
TOR	Torvane	DD	Dry Density
CON	Consolidation	ATT	Atterberg Limits
DS	Direct Shear	CBR	California Bearing Ratio
P200	Percent Passing U.S. Standard No. 200 Sieve	ос	Organic Content
HYD	Hydrometer Gradation	Р	Pushed Sample
VIRONME	NTAL TESTING EXPLANATIONS		
CA	Sample Submitted for Chemical Analysis	s ND	Not Detected
PID	Photoionization Detector Headspace	NS	No Visible Sheen
nnm	Analysis Parts Per Million	SS	Slight Sheen
ppm P	Pushed Sample	MS	Moderate Sheen
Г	rusneu sampie	HS	Heavy Sheen
	,		TO TEST PIT AND

CONSISTANCY - COARSE-GRAINED SOILS		CONSISTANCY - FINE-GRAINED SOILS		
Relative Density	Standard Penetration Resistance	Consistency	Standard Penetration Resistance	Unconfined Compressive Strength (tsf
Very Loose	0 - 4	Very Soft	Less than 2	Less than 0.2
Loose	4 - 10	Soft	2 - 4	0.25 - 0.50
Medium Dense	10 – 30	Medium Stiff	4 - 8	0.50 - 1.0
Dense	30 – 50	Stiff	8 - 15	1.0 - 2.0
Very Dense	More than 50	Very Stiff	15 - 30	2.0 - 4.0
		Hard	More than 30	More than 4.0
OIL CLASSIFICATIO	ON NAME			
Name and Modifier Terms		ns	Constituent Percentage	
Coarse-grained	GRAVEL, SAND		>50%	
	sandy, gravelly		30 - 50%	
	silty, clayey		15 - 50%	
	some (gravel, sand)		15 - 30%	
	some (silt, clay)		5 - 15%	
	trace (gravel, sand)			
	trace (silt, clay)		<5%	
Fine-grained	CLAY, SILT		>50%	
	silty, clayey		30 - 50%	
	sandy, gravelly		30 30%	
	some (sand, gravel)		15 - 30%	
	some (silt, clay)			
	trace (sand, gravel)		5 - 15%	
	trace (silt, clay)			
Organic	PEAT	50 - 100%		
	organic (soil name)		15 - 50%	
IOISTURE CLASSIFIC	(soil name) with some	e organics	5 -	1 5%
			printal wear	
Term		Field Test		
dry moist		very low moisture, dry to touch		
wet		damp, without visible moisture visible free water, usually saturated		
RAIN SIZE CLASSIFI		visible free water, us	uany saturated	
Descr		Sieve*		bserved Size
boulders		21446		>12"
cobl		····		3"-12"
gravel	coarse	0.75"-3"		0.75"-3"
	fine	#4 - 0.75"	+	0.75 ⁻⁵).19" – 0.75"
sand	coarse	#10 - #4		.079" - 0.19"
	medium	#40 - #10		017" - 0.079"
	fine	#200 - #40		029" - 0.017"
fines		<#200		<0.0029"
Jse of #200 field sie	ve encouraged			
GEO DESIGNE		SOIL CLASSIFICATION SYSTEM AND GUIDELINES		

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Boring B-2 encountered drilling refusal at 9.0 feet bgs, possibly due to rip-rap, river gravels, or cobbles. Monitoring well boring MW-1 encountered 8 feet of fill material underlain by gray sand and silt before encountering drilling refusal in brown gravel at 19.5 feet bgs. Monitoring well boring MW-2, a 30-foot boring, encountered 24 feet of fill underlain by gray silty sand with gravel. Monitoring well boring MW-3 encountered 14 feet of fill, including wood and brick debris at approximately 7.5 feet bgs. The fill was underlain by brown to red sand and gray silt to the bottom of the borehole at 30 feet bgs. Monitoring well boring MW-4 was also a 30-foot boring, and it encountered brown and gray sand and gravel fill throughout its entire depth. Monitoring well boring MW-5 encountered 22 feet of fill underlain by gray sand to silty sand to the final depth of the boring at 30 feet bgs. Monitoring well boring MW-6 was advanced to a depth of 21.5 feet bgs, encountering 14 feet of fill underlain by gray silty sand and gray silt.

Continuous soil samples were obtained from the eight borings, and the soils were field-screened using visual examination and headspace vapor screening methods. Field headspace vapor screening was accomplished using a PID and recorded on the boring logs in Appendix A. Soil samples were selected for laboratory analysis, including one sample per boring from the groundwater interface and the sample having the highest PID reading. In the absence of a PID detection, only the sample from the groundwater interface was selected for analysis.

Using the above selection criteria, one soil sample each was selected from B-2, MW-3, MW-4, MW-5, and MW-6 for analysis, and two soil samples from B-1, MW-1, and MW-2 were selected for analysis. The soil samples were submitted under a chain-of-custody to NCA for analysis. One sample from each of the eight borings was analyzed for total 13 priority pollutant metals by EPA Method 6000/7000 series, and PAHs by EPA Method 8270M-SIM. Soil samples collected from B-1, B-2, MW-1, MW-2, and MW-4 were tested for diesel-range petroleum hydrocarbons by Method NWTPH-Dx. Soil samples collected from B-2, MW-2, and MW-6 were analyzed for VOCs by EPA Method 8260B. Specific laboratory results can be reviewed in Tables 2 and 3, and results are summarized in Section 7.2 below.

6.2 GROUNDWATER SAMPLING

6.2.1 Groundwater Monitoring Well Installation

Permanent groundwater monitoring wells were constructed in direct push borings MW-1 through MW-6 on March 21 and 24, 2003. Monitoring wells were constructed with 1.5-inch-inside diameter polyvinyl chloride casing and pre-packed well screens. The screened intervals of the monitoring wells range from 4.5 to 30 feet bgs. Aboveground well monuments were placed over locked well caps. Each aboveground monument is surrounded by three guard posts. The elevation of the top of the well casings was surveyed by Thurston & Associates (a licensed land surveyor). The monitoring well casing elevations are shown on Table 1. Well construction details are shown on the boring logs included in Appendix A.

6.2.2 Groundwater Monitoring and Sampling

GeoDesign conducted groundwater monitoring and sampling activities at the site on April 16, 2003. On May 8, 2003, groundwater levels in the wells were measured from the top of the casing to the nearest 0.01 foot using an electronic water level indicator. Groundwater elevation measurements are presented in Table 1.



The depth to groundwater in the monitoring wells ranged from 6.95 feet (MW-1) to 20.05 feet (MW-3) from the top of well casing. Converting these measurements to elevation based on a surveyed datum yielded groundwater elevations ranging from 11.86 feet above mean sea level (MSL) to 19.20 feet above MSL (MW-6). Groundwater elevations were plotted and hand contoured. The resulting groundwater flow direction is east-northeast toward the Willamette River at a gradient of approximately 0.045 vertical feet per lineal foot (ft/ft). The groundwater elevation contour map interpreted from the May 8, 2003 data is shown on Figure 3.

Before sample collection, each well was purged a minimum of three casing volumes of water using an electric peristaltic pump with dedicated tubing, while recording field readings of pH, temperature, electrical conductivity, and dissolved oxygen. When these parameters stabilized, groundwater samples were collected. Groundwater samples were collected directly from dedicated pump tubing and discharged into laboratory-supplied containers. Water samples submitted for total metals analysis were unfiltered.

Groundwater samples collected during the April 2003 monitoring event were transported under chain of custody to NCA of Beaverton, Oregon. The groundwater samples were analyzed for a variety of chemical parameters described in Section 3.0, including VOCs by EPA Method 8260B, PAHs by EPA Method 8270M-SIM, and 13 priority pollutant total metals by EPA Method 6010B/7000 series. Chemical analytical data for the groundwater samples submitted for the April 2003 event are presented in Tables 4 and 5 and discussed in Section 7.2 below. Laboratory data sheets, chain-of-custody records, and laboratory quality control documentation for the groundwater samples are presented in Appendix B.

7.0 CHEMICAL ANALYTICAL RESULTS

7.1 SOIL

Diesel and heavy oil range hydrocarbons were detected in three of the eight samples analyzed. Diesel was detected in MW-4 (18-19) at a concentration of 31.0 milligrams per kilogram (mg/Kg), heavy oil was detected in the samples from MW-1 (8-9) and MW-4 (18-19) at concentrations of 57.6 and 66.1 mg/Kg, respectively (Table 2). All detected concentrations were less than the DEQ's Level I Soil Matrix Cleanup Standard of 100 mg/Kg, which is the most stringent cleanup standard.

Three soil samples were analyzed for VOCs, including B-2 (7-9), MW-2 (18-20), and MW-6 (13-15). Of the three, only one VOC, 2-chlorotoluene, was detected in one sample (B-2 (7-9)) at a concentration of 266 mg/Kg (Table 3). The concentration of all other VOC analytes in sample B-2 (7-9) and all VOCs in samples MW-2 (18-20) and MW-6 (13-15) were below the method reporting limit (MRL). No EPA Region 9 PRG or DEQ Risk Based Concentration (RBC) were established for 2-chlorotoluene.

Eleven soil samples were submitted for PAH analysis (Table 3). Several PAHs were detected by the analysis, including the following:

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- Acenaphthene was detected in 2 of the 11 samples at a concentration of 15.9 micrograms per kilogram (μ g/Kg) in MW-4 (18-19) and 45.3 μ g/Kg in B-1(8-10).
- Benzo(a)anthracene was detected in seven samples at concentrations ranging from 20.4 μg/Kg in B-1(17-18) to 111 μg/Kg in B-2(7-9).
- Benzo(a) pyrene was detected in seven samples at concentrations ranging from 17.1 μ g/Kg in B-1(17-18) to 138 μ g/Kg in B-2 (7-9).
- Benzo(b)fluoranthene was detected in seven samples at concentrations ranging from 18.5 μ g/Kg in B-1(17-18) to 85.2 μ g/Kg in MW-6 (13-15).
- Benzo(ghi)perylene was detected in seven samples at concentrations ranging from 18.6 µg/Kg in B-1(17-18) to 149 µg/Kg in MW-6 (13-15).
- Benzo(k)fluoranthene was detected in six samples at concentrations ranging from 18.8 μ g/Kg in MW-1(8-9) to 89.9 μ g/Kg in B-2 (7-9).
- Chrysene was detected in seven samples at concentrations ranging from 24.6 μ g/Kg in B-1 (17-18) to 139 μ g/Kg in B-2 (7-9).
- Fluoranthene was detected in seven samples at concentrations ranging from 76 μ g/Kg in B-1(17-18) to 310 μ g/Kg in B-1(8-10).
- Fluorene was detected in two samples at a concentration of 14.2 μ g/Kg in B-1 (17-18) and 14.3 μ g/Kg in MW-4 (18-19).
- Indeno(1,2,3-cd)pyrene was detected in six samples at concentrations ranging from 19.2 μ g/Kg in MW-1 (8-9) to 100 μ g/Kg (MW-6 (13-15).
- Phenanthrene was detected in six samples at concentrations ranging from 27.0 μ g/Kg in MW-4 (18-19) to 144 μ g/Kg in B-1 (8-10).
- Pyrene was detected in seven samples at concentrations ranging from 61.6 μ g/Kg in MW-1(8-9) to 327 μ g/Kg in B-1(8-10).

The concentrations of PAHs were all below the PRGs and applicable DEQ RBCs shown on Table 3.

Various metals were detected in the soil samples obtained from B-1, B-2, MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6 as shown on Table 2 and summarized below:

- Antimony was below the MRL in all but one sample, B-2 (7-9) at 8.99 mg/Kg.
- Arsenic was detected in all eight samples at concentrations ranging from 1.66 mg/Kg in MW-1 (8-9) to 2.91 mg/Kg in MW-3 (19-20).
- Beryllium was detected in four samples at concentrations ranging from 0.298 mg/Kg in MW-4 (18-19) to 0.742 mg/Kg in MW-1 (8-9).
- Cadmium was detected in one sample, B-2 (7-9), at a concentration of 5.39 mg/Kg.
- Chromium was detected in all eight samples at concentrations ranging from 11.3 mg/Kg in MW-4 (18-19) to 22.9 mg/Kg in MW-1 (8-9).
- Copper was detected in all eight samples at concentrations ranging from 15.9 mg/Kg in B-1(8-10) to 35.7 mg/Kg at MW-2 (18-20).
- Lead was detected in all eight samples at concentrations ranging from 4.04 mg/Kg in MW-2 (18-20) to 11.1 mg/Kg in MW-6 (13-15).
- Mercury was detected in one sample, MW-4 (18-19), at a concentration of 0.182 mg/Kg.
- Nickel was detected in all eight samples at concentrations ranging from 13.6 mg/Kg in MW-1 (8-9) to 23.4 mg/Kg in MW-5 (22-23).



FEET SE

- Selenium, silver, and thallium were all below the MRLs in all tested samples.
- Zinc was detected in all eight samples at concentrations ranging from 51.0 mg/Kg in MW-3 (19-20) to 92.4 mg/Kg in B-2(7-9).

Of the detected metals, only the concentration of arsenic exceeds the EPA Region 9 Industrial PRG of 1.6 mg/Kg. However, the highest detected arsenic concentration of 2.91 mg/Kg is within the range of regional naturally-occurring arsenic concentrations shown on Table 6. The lead concentration in all samples is less then the Region 9 PRG of 750 mg/Kg, but it exceeds the DEQ's generic RBC of 1.5 mg/Kg for the leaching to groundwater pathway. Nevertheless, no leachable lead was detected above the MRL by the Toxic Characteristic Leaching Procedure (TCLP), showing that lead at the site is not leachable (Table 2).

7.2 GROUNDWATER

Groundwater quality beneath the project site was characterized by sampling six groundwater monitoring wells. The groundwater samples were obtained from MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6 on April 15, 2003, and then were submitted to NCA under a chain of custody. All samples were submitted for analysis of 13 priority pollutant total metals by EPA Method 6010B/7000 series and PAHs by EPA Method 8270M-SIM. Groundwater samples collected from monitoring wells MW-2 and MW-6 were also analyzed for VOCs by EPA Method 8260B. Results are presented in Tables 4 and Table 5 and summarized below.

Various metals were detected in the water samples collected from monitoring wells MW-2, MW-3, MW-4, MW-5, and MW-6 as follows:

- Antimony was detected only in sample MW-4 at a concentration of 0.00101 milligrams per liter (mg/L).
- Arsenic was detected in MW-2, MW-3, MW-4, and MW-5 at concentrations ranging from 0.0012 mg/L in MW-3 to 0.0195 mg/L in MW-4.
- Beryllium was detected only in sample MW-4 at a concentration of 0.00357 mg/L.
- Cadmium was detected only in sample MW-4 at a concentration of 0.00202 mg/L.
- Chromium was detected in the samples from MW-3 and MW-4 at concentrations of 0.00183 and 0.182 mg/L, respectively.
- Copper was detected in three samples at concentrations ranging from 0.00218 mg/L in MW-3 to 0.435 mg/L in MW-4.
- Lead was detected in three samples at concentrations ranging from 0.00117 mg/L in MW-3 to 0.692 mg/L in MW-4.
- Mercury was detected only in MW-4 at a concentration of 0.000973 mg/L.
- Nickel was detected in MW-3 and MW-4 at concentrations of 0.00413 and 0.139 mg/L, respectively.
- Selenium was detected in MW-4 and MW-5 at concentrations of 0.00103 and 0.00119 mg/L, respectively.
- Silver was detected in MW-2 and MW-4 at concentrations of 0.00138 and 0.0149 mg/L, respectively.
- Thallium was not detected above the MRL in any of the samples analyzed.
- Zinc was detected in MW-3 and MW-4 at concentrations of 0.00774 and 0.635 mg/L, respectively.



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Only the concentration of arsenic in MW-2, MW-3, MW-4, and MW-5 exceeded the EPA Region 9 Tapwater PRG of 0.000045 mg/L. However, the highest detected concentration of arsenic (0.0195 mg/L) at the site is within the range of regional naturally-occurring arsenic concentrations shown on Table 6. In addition, only the concentration of lead in MW-4 (0.692 mg/L) exceeded the DEQ's groundwater ingestion RBC of 0.015 mg/L for the occupational receptor. A beneficial water ruse determination will be needed to determine if the groundwater ingestion pathway is complete at the site.

The maximum detected concentrations of chromium, copper, lead, mercury, nickel, silver, and zinc exceed DEQ's ecological risk levels for aquatic plants, invertebrates, and wildlife as shown on Table 4. An ecological risk assessment may be necessary to determine whether or not any ecological receptors are found at the site that could be at risk to the total metals concentrations. But first, filtered groundwater samples will be submitted for dissolved metals analysis to determine if concentrations still exceed ecological risk levels.

PAHs were detected in the groundwater samples obtained from MW-3, MW-4, and MW-5 as shown on Table 5 and summarized below.

- Acenaphthene was detected in three samples at concentrations ranging from 0.196 micrograms per liter (μg/L) in MW-5 to 0.808 μg/L in MW-4.
- Benzo(ghi)perylene was detected only in sample MW-4 at a concentration of 0.10 μg/L.
- Naphthalene was detected only in MW-4 at a concentration of 0.135 μg/L.
- Phenanthrene was detected in three samples at concentrations ranging from 0.117 μ g/L in MW-3 to 0.277 μ g/L in MW-5.
- Pyrene was detected in three samples at concentrations ranging from 0.649 μ g/L in MW-4 to 1.11 μ g/L in MW-3.

None of the detected PAH concentrations exceeded the EPA Region 9 PRGs or DEQ RBCs.

Acenapthene, fluoranthene, and phenanthrene exceeded the DEQ's ecological risk levels for aquatic plants, invertebrates, and wildlife as shown on Table 5. An ecological risk assessment may be necessary to determine whether any ecological receptors are found at the site that are at risk to these PAH concentrations.

VOCs were not detected above MRLs in the groundwater samples collected from MW-2 and MW-6.

8.0 CONCLUSIONS AND RECOMMENDATIONS

GeoDesign has completed a Phase II ESA which addresses subsurface soil and groundwater underlying the upland portion of the Marine Finance site located in Portland, Oregon. Except for collection of surface soil samples, the investigation followed DEQ's recommended scope of work to complete the XPA performed by Jacobs and included the following tasks:

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GEO DESIGNE

- Soil sampling from at least two discrete depth intervals at locations with the highest contaminant levels in surface soil and from the former UST location.
- Installation of six groundwater monitoring wells across the eastern side of the property to assess groundwater contaminants potentially discharging to the Willamette River and determine groundwater flow direction and gradient.
- Collection of groundwater samples from the six monitoring wells.
- Laboratory analysis of soil and groundwater samples for diesel- and heavy oil-range hydrocarbons, VOCs, PAHs, and 13 priority pollutant total metals.
- Comparison of analytical results to applicable DEQ RBCs and EPA Region 9 PRGs.

The results of the Phase II ESA are as follows:

- Seven to 30 feet of apparent Columbia River dredge fill consisting of sandy silt with some gravel underlies the site. The fill appears to increase in thickness toward the river front. The fill is underlain by moist to wet sand, sandy silt, silt, and gravel. Groundwater was encountered in the borings at depths ranging from 7 to 20 feet bgs on western and eastern portions of the site, respectively.
- The depth to groundwater in monitoring wells ranged from 6.95 feet (MW-1) to 20.05 feet (MW-3) from the top of well casing. Converting these measures to elevation based on a surveyed datum yielded groundwater elevations ranging from 11.86 feet above MSL in MW-4 to 19.20 feet above MSL in MW-6. The resulting groundwater flow direction is east-northeast toward the Willamette River at a gradient of approximately 0.045 ft/ft).
- Diesel- and/or heavy oil-range hydrocarbons detected in soil samples collected near the
 former ferry ramp (MW-1(8-9)) and in the vicinity of the UST pipeline (MW-4 (18-19)) are below
 the DEQ's Level I Soil Matrix Cleanup Standard of 100 mg/Kg. Furthermore, PAH
 concentrations detected in these two borings and other borings advanced at the site are
 below the DEQ's most stringent RBCs and the EPA Region 9 PRGs.
- Of the several priority pollutant metals detected in soil samples collected at the site, only the
 concentrations of arsenic slightly exceed the EPA Region 9 industrial PRG of 1.6 mg/Kg. The
 arsenic detected in these soil samples at concentrations ranging from 1.66 to 2.91 mg/Kg
 are within the range of naturally-occurring arsenic.
- Total lead detected in the soil samples exceeds the DEQ's RBC of 1.5 mg/Kg for the soil leaching to groundwater pathway, occupational scenario. However, no leachable lead was detected in any of the samples submitted for TCLP analysis. This analysis indicates that the lead at the site is not leachable.
- Two or more priority pollutant total metals were detected in groundwater samples collected from five of the monitoring wells (MW-2 through MW-6). Of the metals, only the concentrations of arsenic exceeded the EPA Region 9 Tap Water PRG of 0.000045 mg/L. The arsenic detected in these samples at concentrations ranging from 0.00139 mg/L (MW-2) to 0.0195 mg/L (MW-4) are within the range of naturally-occurring arsenic and are probably due to suspended sediment particles in the sample. Similarly, the total lead concentration in one sample (MW-4) exceeds the DEQ's groundwater ingestion RBC of 0.015 mg/L for the occupational scenario. The lead detected in this sample may be due to lead in suspended sediment particles in the groundwater sample.



- The low concentrations of PAHs detected in groundwater samples from three wells are all below the DEQ's RBCs for all groundwater pathways and the EPA Region 9 Tap Water PRGs.
 No VOCs were detected above MRLs in the two groundwater samples analyzed.
- Chromium, copper, lead, mercury, nickel, silver, zinc, acenapthene, fluoranthene, and phenanthrene exceeded DEQ ecological risk levels for aquatic plants, invertebrates, and wildlife.

Based on the results of our findings it is our opinion that the following tasks be completed.

- Conduct the second quarter of groundwater monitoring in July or October 2003. Submit the samples for the same suite of analyses conducted during the first quarter, with the addition of analysis for dissolved metals to determine if arsenic and lead in groundwater exceeds PRGs and DEQ's RBCs.
- Collect surface soil samples at approximately 10 locations as recommended by DEQ. Submit the samples for NWTPH-HCID analysis and request follow-up TPH analysis based on HCID detections, e.g. NWTPH-Dx for diesel and heavy oil. Perform PAH analysis on those samples with TPH-Dx detections. Submit soil samples for analysis of lead and arsenic only. Perform follow-up analysis of samples for TCLP lead. Collect and analyze at least 2 of the 10 samples from areas outside of potential contamination area and utilize as background metals concentrations.
- Conduct further assessment of aquatic ecological risks by submitting aqueous samples for dissolved metals. Then as necessary, conduct a Level I Scoping Ecological Risk Assessment.
- Complete a Beneficial Water Use Determination.

9.0 LIMITATIONS

This environmental services report has been prepared for Marine Finance Corporation c/o Digital Video Systems. This report is not intended for use by others, and the information contained herein is not applicable to other sites. Our interpretations of subsurface conditions are based on data from select soil samples obtained from this limited area. The results of the analyses only indicate the presence or absence of petroleum hydrocarbons and related compounds in those discrete sample locations. Analytical data from the laboratory samples should only be considered as indicators of site conditions and not a guarantee of the absence of subsurface impact in areas not sampled.

The conclusions presented in this report are based on our observations made during field investigations and chemical analytical data. The findings of this assessment should be considered as a professional opinion based on our evaluation of selected and limited data.

Our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

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We appreciate the opportunity to be of service to you. Please call if you have questions regarding this report.

Sincerely,

GeoDesign, Inc.

3116

Project Geologist

Robert E. Belding, R.G Principal Geologist



APPENDIX B

CHEMICAL ANALYTICAL PROGRAM

Chain-of-custody procedures were followed during handling and transport of the soil samples to the analytical laboratory. The laboratory holds the samples in cold storage pending extraction and/or analysis. The analytical results, analytical methods reference and laboratory quality control records are included in this appendix. The analytical results also are summarized in the tables of this report.

REVIEW OF ANALYTICAL DATA

GeoDesign maintains an internal quality assurance (QA) program, consisting of the following field procedures:

Trip Blanks - Trip Blanks are laboratory prepared water samples that are free of contaminants. The blanks are carried through the sample collection process along with the field samples to document that contaminants were not introduced to the samples during sample handling and analysis.

Equipment Rinsate Blanks - Equipment Rinsate Blanks are water samples that are obtained by collecting contaminant-free water as it is being poured over decontaminated field equipment. The blanks are analyzed to ensure that proper decontamination procedures were followed in the field.

Duplicates - Duplicates are obtained by collecting a second set of water samples from one water source. The duplicates are submitted to the laboratory anonymously for analysis. The analytical results are then compared by calculating the relative percent difference between the samples.

In addition, the analytical laboratory maintains an internal QA program, consisting of a combination of the following:

Blanks - Blanks are laboratory prepared water samples that are free of contaminants. The blanks are carried through the analysis procedure along with the field samples to document that contaminants were not introduced to the samples during sample handling and analysis.

Surrogate Recoveries - Surrogates are organic compounds that are similar in nature to the analytes of concern but are not normally found in nature. The surrogates are added to quality control and field samples prior to analysis. The percent recovery of the surrogate is calculated to demonstrate acceptable method performance.

Duplicates - Duplicates are obtained by splitting a sample into two parts. The two separate parts are carried through the analyses. The analytical results are then compared by calculating the relative percent difference between the samples.



Matrix Spike and Matrix Spike Duplicate (MS/MSD) Recoveries - An MS sample is a sample that has been split into a second portion. The MSD is obtained by further splitting the MS sample. A known concentration of the analyte of interest is added to the MS and MSD samples. The analytical results for both samples are then compared for relative percent difference and percent recovery to demonstrate acceptable method performance.

Blank Spike and Blank Spike Duplicate (BS/BSD) Recoveries - BS and BSD samples are obtained and analyzed in the same procedure as the MS/MSD samples. However, the laboratory blank sample is used to obtain the BS/BSD samples. The percent recovery and relative percent difference of the known concentration of analyte of interest added to the BS/BSD sample is calculated after chemical analyses to demonstrate acceptable method performance.

SUMMARY OF ANALYTICAL DATA REVIEW

GeoDesign reviewed the attached analytical data report for data quality exceptions and deviations from acceptable method performance criteria. Based on our review, the analytical data are acceptable for their intended use.



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GEODESIGN, INC.

18 April, 2003

Paul Trone

GeoDesign 14945 SW Sequoia Parkway,Suite 170 Portland, OR 97224

RE: MarineFin-1-01

Enclosed are the results of analyses for samples received by the laboratory on 03/25/03 15:35. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

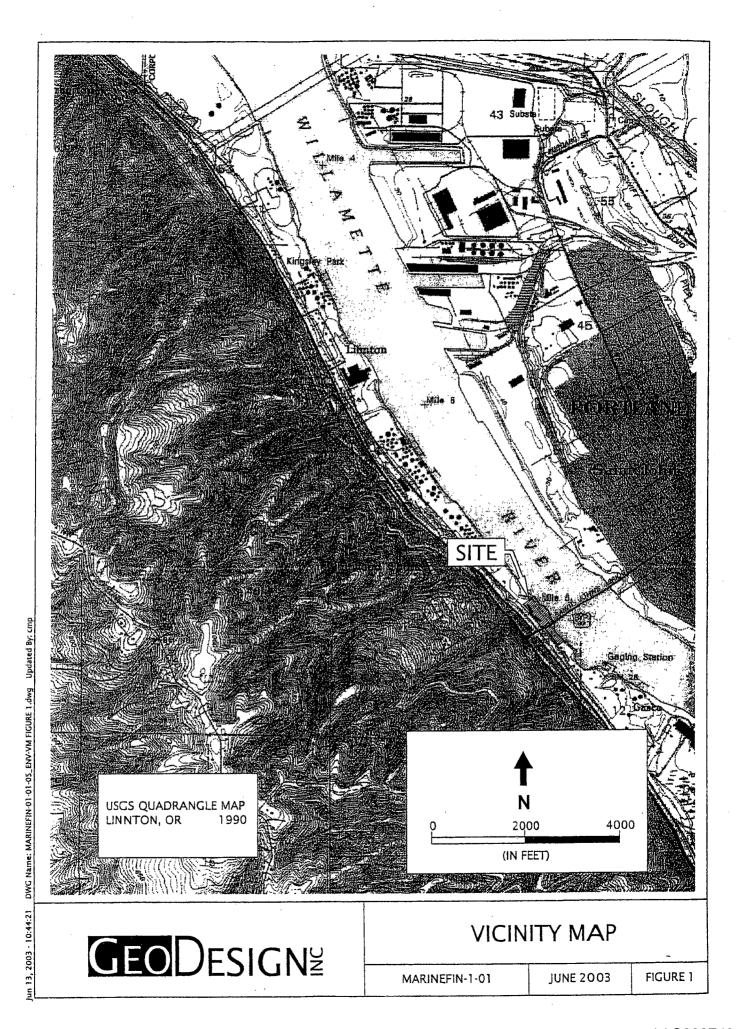
Philip Nerenberg

Laboratory Manager

Work Orders included in this report:

[®]P3C0737

North Creek Analytical, Inc. Environmental Laboratory Network





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Portland, OR 97224

Project Number: na

Project Manager: Paul Trone

Reported: 04/18/03 12:13

ANALYTICAL REPORT FOR SAMPLES

	Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
	B-1 (8-10)	P3C0737-01	Soil	03/24/03 12:00	03/25/03 15:35
Estil	B-2 (7-9)	P3C0737-02	Soil	03/24/03 12:00	03/25/03 15:35
The state of the s	B-1 (17-18)	P3C0737-03	Soil	03/24/03 12:00	03/25/03 15:35
	MW-1 (8-9)	P3C0737-04	Soil	03/21/03 12:00	03/25/03 15:35
ব্যস্ত	MW-2 (18-20)	P3C0737-05	Soil	03/21/03 12:00	03/25/03 15:35
141	MW-2 (23-25)	P3C0737-06	Soil	03/21/03 12:00	03/25/03 15:35
•	MW-3 (19-20)	P3C0737-07	Soil	03/21/03 12:00	03/25/03 15:35
	MW-4 (18-19)	P3C0737-08	Soil	03/21/03 12:00	03/25/03 15:35
\$- ?4	MW-5 (22-23)	P3C0737-09	Soil	03/21/03 12:00	03/25/03 15:35
<u> </u>	MW-6 (13-15)	P3C0737-10	Soil	03/21/03 12:00	03/25/03 15:35
	MW-1 (14-15)	P3C0737-11	Soil	03/21/03 12:00	03/25/03 15:35

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Philip Nevenberg

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GeoDesign Project: MarineFin-1-01 14945 SW Sequoia Parkway,Suite 170 Project Number: na

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Reported: 04/18/03 12:13

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method

North Creek Analytical - Portland

Project Manager: Paul Trone

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
B-1 (8-10) (P3C0737-01RE1) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/	03	
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	04/03/03	3030967	D-13
Heavy Oil Range Hydrocarbons	ND	50.0	11	17	H	**	19	*	D-13
Surr: 1-Chlorooctadecane	96.7 %	50-150							
B-2 (7-9) (P3C0737-02) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/	03	
Diesel Range Organics	ND	25.0	mg/kg dry	`1	NWTPH-Dx	03/31/03	03/31/03	3030967	··········
Heavy Oil Range Hydrocarbons	ND	50.0	"		11	п	11	n	
Surr: 1-Chlorooctadecane	92.7 %	50-150	· · · · · · · · · · · · · · · · · · ·						······
B-1 (17-18) (P3C0737-03) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/	03	
B-1 (17-18) (P3C0737-03) Soil Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	03/31/03	3030967	
Heavy Oil Range Hydrocarbons	ND	50.0	#	0	. 11	Ħ	n	н	
Surr: 1-Chlorooctadecane	95.3 %	50-150							
MW-1 (8-9) (P3C0737-04RE1) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	04/03/03	3030967	D-13
Heavy Oil Range Hydrocarbons	57.6	50.0	11	11	*	11	11	H	D-13
Surr: 1-Chlorooctadecane	101 %	50-150							
MW-2 (18-20) (P3C0737-05) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	03/31/03	3030967	
Heavy Oil Range Hydrocarbons	ND	50.0	H	- H	"	н	н .	11	
Surr: 1-Chlorooctadecane	93.1 %	50-150				-			
MW-2 (23-25) (P3C0737-06RE1) Soil	·				Sampled: 03/2	1/03 Recei	ived: 03/25/0	03	
Diesel Range Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	04/03/03	3030967	D-13
Heavy Oil Range Hydrocarbons	ND	50.0	"	**	"		"	11	D-13
Surr: 1-Chlorooctadecane	98.4 %	50-150							

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14945 SW Sequoia Parkway, Suite 170 Project Number: na

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Reported:

Portland, OR 97224

Project Manager: Paul Trone

04/18/03 12:13

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method

Project: MarineFin-1-01

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Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-4 (18-19) (P3C0737-08RE1) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	·····
Diesel Range Organics	31.0	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	04/03/03	3030967	D-13
Heavy Oil Range Hydrocarbons	66.1	50.0			н	#	17	11	D-13
Surr: 1-Chlorooctadecane	111 %	<i>50-150</i>							
MW-1 (14-15) (P3C0737-11) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	******
Diesel Range-Organics	ND	25.0	mg/kg dry	1	NWTPH-Dx	03/31/03	03/31/03	3030967	4
Heavy Oil Range Hydrocarbons	ND	50.0	#	n 	#	H	"		
Surr: 1-Chlorooctadecane	84.3 %	50-150							

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Philip Nerenberg, Laboratory Manager

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Project Number: na

Project Manager: Paul Trone

Reported:

04/18/03 12:13

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

41.4	·		Reporting							
	Analyte	Result	Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
er-tr	B-1 (8-10) (P3C0737-01) Soil		· 		, ,	Sampled: 03/2	4/03 Rece	ived: 03/25/	03	
	Antimony	ND	0.500	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
8.72	Arsenic	2.42	0.370	H -	**	н	03/26/03	03/27/03	3030870	
	Beryllium	0.376	0.370	#	**	19	*	n	**	
100	Cadmium	ND	0.370	11	**	n .	II	04/02/03	Ħ	
100	Chromium	13.2	0.370	11	**	4	Ħ	03/27/03	n .	
·Q	Copper	15.9	1.48	n	17	н	#1		*	
are to	Lead	4.73	0.370	*	tr	11	н	04/02/03	"	
	Mercury	ND	0.100	*		EPA 7471A	03/31/03	03/31/03	3031013	
EST	Nickel	17.9	0.741	".	**	EPA 6020	03/26/03	03/27/03	3030870	
	Selenium	ND	0.370	н	. 11	19	# .	"	H	
	Silver	ND	0.500	"	n	**	04/02/03	04/04/03	3040095	
	Silver Thallium	ND	0.500	u	•		*	04/03/03	н	
	Zinc	62.8	1.48	II.	н	H	03/26/03	03/27/03	3030870	
	B-2 (7-9) (P3C0737-02) Soil				S	Sampled: 03/2	1/02 Decei	ved: 03/25/0	12	
	Antimony	8.99	0.355		1		04/02/03			
	Arsenic	2.27	0.305	mg/kg dry "	1	EPA 6020		04/04/03	3040095	
	Beryllium	0.375	0.305	Ħ	1)		03/26/03	03/27/03	3030870	
	Cadmium	5.39	0.305	n	#					
	Chromium	16.4	0.305	н	n		*	" "	,,	
073		17.1	1.22	н	11	11	*	"	 H	
	Copper Lead	5.82	0.305	**	11	#		04/02/03		
5000	Mercury	ND	0.0893		19	EPA 7471A	03/31/03	03/31/03	3031013	
	Nickel	18.5	0.610	Ħ	*	EPA 6020	03/31/03	03/31/03	3031013	
1.100	Selenium	ND	0.305		H	H A 0020	03/20/03 #	U3/2//U3	3030670	
	Silver	ND	0.355	n	,,	**	04/02/03	04/04/03	3040095	
	Thallium	ND	0.355	н	**	п	11 .	04/03/03	3040093	
	Zinc	92.4	1.22	#	н	Ħ	03/26/03	03/27/03	3030870	
	· ·	7 # • **	1.44				03120103	03/4//03	2020010	
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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

	Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
1536	· · · · · · · · · · · · · · · · · · ·	100011		· · · · · · · · · · · · · · · · · · ·						140163
िक	MW-1 (8-9) (P3C0737-04) Soil	· · · · · · · · · · · · · · · · · · ·			(1	Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
	Antimony	ND	0.500	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
Par	Arsenic	1.66	0.321	11	n n	n	03/26/03	03/27/03	3030870	
	Beryllium	0.742	0.321	U	11	Ħ	**	19	a	
list.	Cadmium	ND	1.95	н	6.08	r	n	04/02/03	п	R-03
140	Chromium	22.9	0.321	Ħ	1	н		03/27/03	"	
	Copper	18.3	1.28	*	**	н	11	**	II.	
	Lead	10.5	0.321	17	H	11	11	04/02/03	11	
	Mercury	ND	0.100	11	*	EPA 7471A	03/31/03	03/31/03	3031013	
R/A	Nickel	13.6	0.641	. "	. #	EPA 6020	03/26/03	03/27/03	3030870	
	Selenium	ND	0.321	н	· n	•	ti ti	11	n	
	Silver	ND	0.500	M	Ħ	W	04/02/03	04/04/03	3040095	
	Thallium	ND	0.500	н	"	*	n	04/03/03	iı	
	Zinc	55.8	1.28	**		u	03/26/03	03/27/03	3030870	
	NATI A (10.00) (DA COTOT OT) C. II				_					
\$1.00	MW-2 (18-20) (P3C0737-05) Soil		······································			Sampled: 03/2	1/03 Recei	ved: 03/25/0)3	
	Antimony	ND	0.309	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
	Arsenic	2.31	0.431	11	H	н	03/26/03	03/27/03	3030870	
1 21	Beryllium	ND	0.431	n	•	•	Ħ	11	. "	
	Cadmium	ND	0.431	*	*	#	*	п	17	
	Chromium	14.2	0.431	H	•	n	**	11	n	
	Copper	35.7	1.72	10	11		H	#	н	
	Lead	4.04	0.431	н	"	n	**	04/02/03	14	
	Mercury	ND	0.0862	11	*	EPA 7471A	03/31/03	03/31/03	3031013	
1.5	Nickel	16.9	0.862	4	0	EPA 6020	03/26/03	03/27/03	3030870	
100	Selenium Silver	ND	0.431	*		**	11	Ħ		
		ND	0.309	*	#	ii.	04/02/03	04/04/03	3040095	
	Thallium	ND	0.309			"	n .	04/03/03	•	
	Zinc	63.6	1.72	•	n	* .	03/26/03	03/27/03	3030870	
1KX										

North Creek Analytical - Portland

Philip Neverberg

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Project Number: na

907.334.9200 fax 907.334.9210

Portland, OR 97224

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Total Metals per EPA 6000/7000 Series Methods

Project: MarineFin-1-01

North Creek Analytical - Portland

186		Reporting				•			İ
Analyte	Result	Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-3 (19-20) (P3C0737-07) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Antimony	ND	0.329	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
Arsenic	- 2.91	0.397	*	*	#	03/26/03	03/27/03	3030870	
Beryllium	ND	0.397		*	Ħ	н	"	•	
Cadmium	ND	0.397	#	H	17	11	n ,	n	
Chromium	13.2	0.397	tt	Ħ	#	*	н	•	
Copper	16.8	1.59	ıı	н	tt	n	н		
Lead	2.24	0.397	п	**	n	n	04/02/03	n	
Mercury	ND	0.0893	11	**	EPA 7471A	03/31/03	03/31/03	3031013	
Nickel	17.0	0.794	н	11	EPA 6020	03/26/03	03/27/03	3030870	
Selenium	ND	0.397	11	Ħ	19	W	16	**	
Silver	ND	0.329	н	H	"	04/02/03	04/04/03	3040095	
Thallium	ND	0.329	п	**	n		04/03/03	#	
Zinc	51.0	1.59	**	**	"	03/26/03	03/27/03	3030870	
MW-4 (18-19) (P3C0737-08) Soil				c	Sampled: 03/2	1/02 Page	ved: 03/25/	N2	
(44)							~~~~~		
Antimony	ND	0.350	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
Arsenic	2.67	0.286	н	"	Ħ	03/26/03	03/27/03	3030870	
Beryllium	0.298	0.286	H	10	it.	. 11		! *	
Cadmium	ND	0.286	11	#	n 	11	19		
Chromium	11.3	0.286		н			11		
Copper Lead	17.5	1.14		n	#	. "		"	
Lead	7.78	0.286			**	. "	04/02/03	"	
Mercury	0.182	0.0862	H	Ħ	EPA 7471A	03/31/03	03/31/03	3031013	
Nickel	15.7	0.571	Ħ	11	EPA 6020	03/26/03	03/27/03	3030870	
Selenium	ND	0.286	н	"		#	"	**	
Silver	ND	0.350			"	04/02/03	04/04/03	3040095	
Thallium	ND	0.350	H		"	"	04/03/03	n	
Zinc	52.8	1.14	11	н	**	03/26/03	03/27/03	3030870	

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Reported:

Project Manager: Paul Trone

Project Number: na

04/18/03 12:13

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-5 (22-23) (P3C0737-09) Soil				5	Sampled: 03/21	/03 Recei	ived: 03/25/0	03	
Antimony	ND	0.397	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
Arsenic	1.76	0.394	*	**	"	03/26/03	03/27/03	3030870	
Beryllium	ND	0.394	m	*	*	**	**	**	
Cadmium	ND	0.394	II	ij	11	Ħ	Ħ	10	
Chromium	19.2	0.394	n	11	Ħ	**	"	п	
Copper	20.0	1.57	н -	U	Ħ	**	H	11	
Lead	5.92	0.394	17	*	n	п	04/02/03	**	
Mercury	ND	0.100	11		EPA 7471A	03/31/03	03/31/03	3031013	
Nickel	23.4	0.787	Ħ	11	EPA 6020	03/26/03	03/27/03	3030870	
Selenium	ND	0.394		w	Ħ	"	IF	19	
Silver	ND	0.397	Ħ	*	11	04/02/03	04/04/03	3040095	
Thallium	ND	0.397	**	10	Ħ	"	04/03/03	**	
Zinc	58.2	1.57	n	11	Ħ	03/26/03	03/27/03	3030870	
MW-6 (13-15) (P3C0737-10) Soil				2	Sampled: 03/21	/03 Recei	ived: 03/25/0	03	
Antimony	ND	0.329	mg/kg dry	1	EPA 6020	04/02/03	04/04/03	3040095	
Arsenic	1.97	0.413	11	н	п	03/26/03	03/27/03	3030870	
Beryllium	ND	0.413			Ħ		п	10	
Cadmium	ND	0.413	u	17	••	**	"	**	
Chromium	15.9	0.413		u	Ħ	n	H	**	
Copper	18.6	1.65		19	#	n	"	H	
Lead	11.1	0.413	H		Ħ	#	04/02/03	н	
Mercury	ND	0.0862	*		EPA 7471A	03/31/03	03/31/03	3031013	
Nickel	21.3	0.826			EPA 6020	03/26/03	03/27/03	3030870	
Selenium	, ND	0.413	*	•	v	n	*	n	
Silver	ND	0.329	*	**	er	04/02/03	04/04/03	3040095	
Thallium	ND	0.329	ir.	11	95	n	04/03/03	H.	
	52.8	1.65	н	**	# .	03/26/03	03/27/03	3030870	
Zinc									

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Reported:

Portland, OR 97224

GeoDesign

Project Manager: Paul Trone

Project Number: na

04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
B-2 (7-9) (P3C0737-02) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/	03	
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
Benzene	- ND	100	"	n	**	•	1*	#1	
Bromobenzene	ND	100			H	Ħ	**	•	
Bromochloromethane	ND	100	**	**	Ħ	*	**	"	
Bromodichloromethane	ND	100	n	11			18	**	
Bromoform Bromoform	ND	100	ų	*	W	н	11	**	
Bromonethane	ND	500	H	n	**	н	10	и	
V 252	ND	1000	H	и	Ħ	п	**	н	
2-Butanone	ND	500	11	и	11	31	**	11	
n-Butylbenzene	ND	100	**	**	Ħ	н	11	11	
sec-Butylbenzene	ND ND	100	n			11	10	11	
tert-Butylbenzene		1000	u	11	v .	¥	17	u	
Carbon disulfide	ND		11	,,	**		**	11	
Carbon tetrachloride	ND	100		11	"	#	**	11	
Chlorobenzene	ND	100		**				H	
Chloroethane	ND	100	#			0	10	91	
Chloroform	ND	100	" "			,	**	**	
Chioromethane	ND	500		18			,,	11	
2-Chlorotoluene	266	100	0	,,			,,	,,	
4-Chlorotoluene	ND	100		,,			16	u	
1,2-Dibromo-3-chloropropane	ND	500	"						
Dibromochloromethane	ND	100	#	"	•		"		
1,2-Dibromoethane	ND	100	*	10			11		
Dibromomethane	ND	100	н	**	"		.,		
1,2-Dibromoethane Dibromomethane 1,2-Dichlorobenzene	ND	100	**	"	*	N			
	ND	100	**	11	#	"	17		
1,3-Dichlorobenzene 1,4-Dichlorobenzene	ND	100	**	11	Ħ	"	16		
Dichlorodifluoromethane	ND	500	*	*	*	**	10	*	
1.1-Dichloroethane	ND	100	Ħ	**	, п	n	**	*	
1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethane	ND	100	97	Ħ	#	* .	**	17	
1,1-Dichloroethene	ND	100	16	н	11	*	**	"	
cis-1,2-Dichloroethene	ND	100	Ħ	*	*	**	**	*	
	ND	100	H	u		н	**	*	
trans-1,2-Dichloroethene 1,2-Dichloropropane	. ND	100	H	•	17	н	**	ti	
1,3-Dichloropropane	ND	100		u	n	H	11	#	
2,2-Dichloropropane	. ND	100	"	11	n	*	**	¥.	
1,1-Dichloropropene	ND	100	. 11	н	*	19	**	•	
1,1-Dichloropropene cis-1,3-Dichloropropene	ND	100	H	#	н	"		19	
trans-1,3-Dichloropropene	ND	100	n	*	н	II	. 11	и	
	ND	100	Ħ	,		n	n	Ÿ.	
Ethylbenzene	ND	100							

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Philip Nerenberg, Laboratory Manager

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Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Number: na

Reported: 04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

Project Manager: Paul Trone

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
B-2 (7-9) (P3C0737-02) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/0	03	
Hexachlorobutadiene	ND	200	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
2-Hexanone	ND	1000	H	н .	11	#	H	и	
Isopropylbenzene	ND	200	n	11	и		•	**	
p-Isopropyltoluene	ND	200	11	u	19	0	11	4	
4-Methyl-2-pentanone	ND	500	*	Ħ	n	**	н	Ħ	
Methyl tert-butyl ether	ND	100	**	H	#	•	"	16	
Methylene chloride	ND	500	11	н		#	19	н	
	ND	200		н	, ,	н	11	ti	
Naphthalene	ND	100	н	н	,,	,,	n	11	
n-Propylbenzene	ND	100	19				11	11	
Styrene	ND	100	к	11		#	44	11	
1,1,1,2-Tetrachloroethane		100	R	н	n	#	#	it	
1,1,2,2-Tetrachloroethane	ND	100		*	,,		**	#	
Tetrachloroethene	ND	100	,,		,,	Ħ		**	
Toluene	ND			11		*	"	16	
1,2,3-Trichlorobenzene	ND	100		,			**		
1,2,4-Trichlorobenzene	ND	100	,,	 H	,		**	.,	
1,1,1-Trichloroethane	ND	100	"	,,			11	11	
1,1,2-Trichloroethane	ND	100	" "	" "				н	
Trichloroethene	ND	100	"	,			"		
Trichlorofluoromethane	ND	100		,,		,,	. "		
1,2,3-Trichloropropane	ND	100			"	 H	"		
1,2,4-Trimethylbenzene	ND	100	11	. *		"		,,	
	ND	100	11	"				,	
Vinyl chloride	ND	100	ir .	*			"	"	
⊚o-Xylene	ND	100	"	u	*	₩	*	"	
m,p-Xylene	ND	200	H			···			
Surr: 4-BFB	82.4 %	65.4-143							
Surr: 1,2-DCA-d4	96.6 %	77.7-144							
Surr: Dibromofluoromethane	86.6 %	66.5-131							
Surr: Toluene-d8	89.3 %	77.5-143							

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Project: MarineFin-1-01

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Project Number: na

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (18-20) (P3C0737-05) Soil					Sampled: 03/2	1/03 Recei	ived: 03/25/	03	
Acetone	ND	2500	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
Benzene	ND	100	*	11	**	11	**	* .	
Bromobenzene	ND	100	н	"	#	Ħ	"	n	
Bromochloromethane	ND	100	tt	11	**	#	•	"	
Bromodichloromethane	ND	100	**	Ħ	Ħ	17	N		
Bromoform	ND	100	**	**	11	11	n	п	
Bromomethane	ND	500	e e	11	11	Ħ	"	*	
2-Butanone	ND	1000	"	10	н	H	11	"	
n-Butylbenzene	ND	500	"	11	#	Ð	(0	11	
sec-Butylbenzene	ND	100	u	н	"	n	"	н	
tert-Butylbenzene	ND	100	Ħ	11	#	*))	H	
Carbon disulfide	ND	1000	*	**	"	"	II		
Carbon tetrachloride	ND	100	41		**	11	10	**	
Chlorobenzene	ND	100	**	•		**	Ħ	н	
Chloroethane	ND	100	**	"	н	#	•	**	
Chloroform	ND	100		*	*	н	Ħ		
Chloromethane	ND	500	"	11	**	Ħ	**	н	
132-Chlorotoluene	ND	100	11	**	11	n	Ħ		
4-Chlorotoluene	ND	100	•	*	11	Ħ	18	NT .	
1,2-Dibromo-3-chloropropane	ND	500	*1	•	*	н	н	u	
Dibromochloromethane	ND	100	"	Ħ	н	17	н	H	
1 2-Dibromoethane	ND	100	n	17	н	17	•	"	
Dibromomethane	ND	100		**	н	Ħ	н	et .	
1,2-Dichlorobenzene	ND	100	*	*	н	*	**		
1.3-Dichlorobenzene	ND	100		it	Ħ	11	**	•	
1,4-Dichlorobenzene	ND	100	Ħ	11	*	#	n .	Ħ	
Dichlorodifluoromethane	ND	500	**	11	Ħ	**	"	н	
1.1 Dichloroethene	ND	100		n	#	*	н	*	
1,1-Dichloroethane 1,1-Dichloroethane	ND	100	Ħ	и	н	. "	Ħ	Ħ	
1,1-Dichloroethene	ND	100	n	н	*	п	. 11	*	
cis-1,2-Dichloroethene	ND	100	11	Ħ	*	*	**	11	
trans-1,2-Dichloroethene	ND	100	. н	*	#	**	H	•	
1,2-Dichloropropane	. ND	100	#	₩ .	•		*	*	
1,3-Dichloropropane	ND	100	**	H		#	**	h	•
2.2 Diski	, ND	100	Ħ	. #	•	11		*	
1,1-Dichloropropene	, ND	100	. н	11	n	n	"	n	
cis-1,3-Dichloropropene	ND	100	*	н	*	11	٠.	Ħ	
trans-1,3-Dichloropropene	ND	100	*		п	"	и	#	
Ethylbenzene	ND	100	, *	n		я	11	n	

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907.334.9200 fax 907.334.9210

Project Number: na

Reported:

Project Manager: Paul Trone

04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (18-20) (P3C0737-05) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Hexachlorobutadiene	ND	200	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
Hexachlorobutadiene 2-Hexanone	ND	1000	π	11	Ħ	H.	11	Ħ	
Isopropylbenzene	ND	200	**	**	•	u	••	•	
	ND	200	ŧŧ	**	19 .	Ť	Ħ	п	
p-Isopropyltoluene 4-Methyl-2-pentanone	ND	500	#	**	rt	11	97	"	
Methyl tert-butyl ether	ND	100	*	#	н .	**	**	H	
Methylene chloride	ND	500	**	. 11	# 1	**	18	**	
Naphthalene	ND	200	н.	н	п	#1	47	**	
n-Propylbenzene	ND	100	"	11	#	n .	**	11	
Styrene	ND	100	11	n	#	n	**	19	
	ND	100	11	n	tt	11	н	**	
1,1,1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane	ND	100	н	*	Ħ	**	**	4	
Tetrachloroethene	ND	100	н	n	W	91	**	•	
Toluene	ND	100	н	Ħ	11	11	**	11	
1,2,3-Trichlorobenzene	ND	100	*	ti	.	"	H ·	n	
1,2,4-Trichlorobenzene	ND	100	#	11	#		**	*	
1,1,1-Trichloroethane	ND	100		19	•	u	**	*	
1,1,2-Trichloroethane	ND	100	II .	H		"	н	**	
1,1,2-Trichloroethane Trichloroethene	ND	100	Ħ	19	11	(1	**		
Trichlorofluoromethane	ND	100	ti	u	•	**	14	"	
1,2,3-Trichloropropane	ND	100	**	II.		**	10		
1,2,4-Trimethylbenzene	ND	100	**	*	Ħ	**	11	и	
1,3,5-Trimethylbenzene	ND	100	18	11	n	"	" .	n	
Vinyl chloride	ND	100	.	17		"	**	H ´	
o-Xylene	ND	100	н	**		н	n	n	
m,p-Xylene	ND	200	н	н		н		n	
Surr: 4-BFB	87.4%.	65.4-143							
Surr: 1,2-DCA-d4	99.6 %	77.7-144			•				
Surr: Dibromofluoromethane	88.2 %	66.5-131							
Surr: Toluene-d8	93.1 %	77.5-14 3							

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Project Number: na

907.334.9200 fax 907.334.9210

Portland, OR 97224

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

Project: MarineFin-1-01

North Creek Analytical - Portland

	Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
	MW-6 (13-15) (P3C0737-10) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
	Acetone	ND	2500	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
腦	Acetone Benzene	- ND	100	11	**	u u	н	10	н	
	Bromobenzene	ND	100	n	**	N	**	11	Ħ	
	Bromochloromethane	ND	100	11	Ħ .	19	#	**	н	
1777	Bromodichloromethane	ND	100	"	17	. "	Ħ	•	H	
	Bromoform	ND	100	"	"		u	**	n	
المتنا	Bromomethane	ND	500	H	n	**	Ħ	**	"	
	2-Butanone	ND	1000	19	11			n	m	
	n-Butylbenzene	ND	500	**	"	#		**	,	
	sec-Butylbenzene	ND	100	11	11	**	н	**	10	
	tert-Butylbenzene	ND	100	**	**	н		11	19	
	Carbon disulfide	ND	1000	**	n	**	#		*	
	Carbon tetrachloride	ND	100	n	n	Ħ	IT	10	ıt	
enter (Chlorobenzene	ND	100	n	H	н	**	11	n	
	Chloroethane	ND	100	11	н	*	**	**	tt	
100	Chloroform	ND	100		19	**	*	H	H	
(Chloromethane	ND	500	*	н	H,	n	н	10	
	2-Chlorotoluene	ND	100			#	**	н	10	
	4-Chlorotoluene	ND	100	•	**	u	п	**	u	
	1,2-Dibromo-3-chloropropane	ND	500	**	er e	H	ti	"	u	
	- II	ND	100	**	Ħ	Ħ	rr rr	10	*	
	1,2-Dibromoethane	ND	100	**	Ħ	H.	*	17		
	Dibromochloromethane 1,2-Dibromoethane Dibromomethane 1,2-Dichlorobenzene	ND	100	н	**	**	n	н	•	
!	1,2-Dichlorobenzene	ND	100	н	н	11	*	n	н	
18	1,3-Dichlorobenzene	ND	100	u	Ħ	н	Ħ	11	19	
	1,4-Dichlorobenzene	ND	100	**	•	Ħ	18	17	et .	
1	Dichlorodifluoromethane	ND	500	16	"	11	*	14	Ħ	
	1,1-Dichloroethane	ND	100	н	H	Ħ		It	tt	
	1,2-Dichloroethane	ND	100	*	**	n .	n	**	**	
,	1,1-Dichloroethene	ND	100	"	*	n	•	n	11	
(cis-1,2-Dichloroethene	ND	100	#	**	Ħ	11	**	"	
	rans-1,2-Dichloroethene	ND	100	**	**	n	•		**	
	1,2-Dichloropropane	· ND	100	ŧŧ	*	Ħ	n	H	**	
7	1,3-Dichloropropane 2,2-Dichloropropane 1,1-Dichloropropene cis-1,3-Dichloropropene	, ND	100	Ħ		•	n	н		
B119 2	2,2-Dichloropropane	ND	100	91		*	Ħ	n .	H	
M 1	l, l-Dichloropropene	ND	100	. 4	H	н	*	19	n	
		ND	100	*	#	•	#	10 .	Ħ	
	rans-1,3-Dichloropropene	ND	100	87	11	#	90	н	H	
	Ethylbenzene	ND	100	н	**		н	**	H •	

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Philip Merenberg

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| Anchorage 3209 Denail Street, Anchorage, AK 99 | GeoDesign | Project: MarineFin-1-01 | 907.334.9200 fax 907.334.9210

14945 SW Sequoia Parkway, Suite 170 Project Number: na

Portland, OR 97224 Project Manager: Paul T

Reported:

Project Manager: Paul Trone 04/18/03 12:13

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

	Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
ومتدرو	MW-6 (13-15) (P3C0737-10) Soil	· · · · · · · · · · · · · · · · · · ·		,		Sampled: 03/2	1/03 Rece	ived: 03/25/0	03	
	Hexachlorobutadiene	ND	200	ug/kg dry	1	EPA 8260B	03/25/03	03/29/03	3030797	
例	2-Hexanone	ND	1000	n	**	#		**	Ħ	
	Isopropylbenzene	ND	200	11	Ħ	18	**	11	**	
	p-Isopropyltoluene	ND	200	tt	н	#	10	"	W	
$i_{i,j}^{r,r}$	4-Methyl-2-pentanone	ND	500	11	H	н		H	n	
tura.	Methyl tert-butyl ether	ND	100	16	19	et		11	n	
F 1777	Methylene chloride	ND	500	11	11	11	H	**	*	
	Naphthalene	ND	200	1)	19	Ħ	n	**	ıı	
63	n-Propylbenzene	ND	100	n	н	н	H	19	#	
	Styrene	ND	100		H	Ħ	H	11	10	
	1,1,1,2-Tetrachloroethane	ND	100	Ħ	H	**	n	**	n	
	1,1,2,2-Tetrachloroethane	ND	100	"	**	**	H	17	ir	
	Tetrachloroethene	ND	100	Ħ	Ħ	11	19	"	n	
	Toluene	ND	100	11	п	Ħ	11	ey	**	
Service of the servic	1,2,3-Trichlorobenzene	ND	100	**	#	"	н	+0	17	
£1:4 €	1,2,4-Trichlorobenzene	ND	100		*	**	н	**	*	
	1,1,1-Trichloroethane	ND	100	#	. 11	**	u	17	11	
	1,1,2-Trichloroethane	ND	100	Ħ	17	*	Ħ	**	ti .	
	Trichloroethene	ND	100	n	*	н	ıı	**	H	
	Trichlorofluoromethane	ND	100	**	"	н		10	n	
G.	1,2,3-Trichloropropane	ND	100	*	"	H.	*	T# .	n	
140.7 140.7 140.7	1,2,4-Trimethylbenzene	ND	100	**		**	H	11	*	
142841	1,3,5-Trimethylbenzene	ND	100	"	11	**	11	"	н	
	Vinyl chloride	ND	100	Ħ	#	**	**	11	И	
	o-Xylene	ND	100	**	Ħ	n	**	"	11	
270	m,p-Xylene	ND	200	"			**	11	0	
	Surr: 4-BFB	88.1 %	65.4-143							
	Surr: 1,2-DCA-d4	98.0 %	77.7-144							
	Surr: Dibromofluoromethane	87.7 %	66.5-131			•				
6772	Surr: Toluene-d8	92.5 %	77.5-143							

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Philip Neromberg

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Reported:

Portland, OR 97224

Project Manager: Paul Trone

Project Number: na

04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
B-1 (8-10) (P3C0737-01) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/	03	R-0
Acenaphthene	45.3	26.8	ug/kg dry	2	EPA 8270m	04/03/03	04/07/03	3040110	
Acenaphthylene	- ND	26.8	н	4	a	u	H	11	
Anthracene	ND	26.8	н	17		"	ie	н	
Benzo (a) anthracene	104	26.8	*	19	Ħ	**	#	•	
Benzo (a) pyrene	114	26.8	u	н	10	18	*	**	
Benzo (b) fluoranthene	72.8	26.8	19	н	ŧŧ	17		m	
Benzo (ghi) perylene	91.6	26.8	•	"	*	"	"	•	
Benzo (k) fluoranthene	71.2	26.8	H	n	11	**	0	11	
Chrysene	139	26.8	11	#	11	10	*	n	
Dibenzo (a,h) anthracene	ND	26.8	11	*	н	11	"	"	
Fluoranthene	310	26.8	11	**	**	н	II.	**	
Fluorene	ND	26.8	11	Ħ	a	n	n	11	
Indeno (1,2,3-cd) pyrene	66.9	26.8		*		н	"	**	
Naphthalene	ND	26.8	n	17	н	#	#	'n	•
Phenanthrene	144	26.8	, "	*	n	11	n	n	
Pyrene	327	26.8	"	Ħ	н	16	0	(1	
Surr: Fluorene-d10	53.2 %	40-150							
Surr: Pyrene-d10	50.0 %	40-150							
Surr: Benzo (a) pyrene-d12	48.8 %	40-150							
B-2 (7-9) (P3C0737-02) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/	03	R-0
Acenaphthene	ND	26.8	ug/kg dry	2	EPA 8270m	04/03/03	04/07/03	3040110	
Acenaphthylene	ND	26.8	11	n	Ħ	"	H	n	
Anthracene	ND	26.8	16	н		17	10	11	
Benzo (a) anthracene	111	26.8	16		n	**	tı	n	
Benzo (a) pyrene	138	26.8	**	*.	*	"	11		
Benzo (b) fluoranthene	82.6	26.8	#	п	Ħ	11	*	н	
Benzo (ghi) perylene	117	26.8	*	#	n	•	*	*	
Benzo (k) fluoranthene	89.9	26.8	**	**	71	11		H	
Chrysene	139	26.8		н	н	11	H	H	
Dibenzo (a,h) anthracene	ND	26.8	п	н	H	и	11	н	
Fluoranthene	254	26.8	Ħ	19	Ħ	10	H		
Fluorene	ND	26.8	11	н	Ħ	16	Ħ	**	
Indeno (1,2,3-cd) pyrene	82.3	26.8	11	m	n	14	H		
Naphthalene	ND	26.8			Ħ	10	н.	*	
Phenanthrene	ND	26.8	• #	Ħ	Ħ	H	H	•	
Pyrene	293	26.8	n	**	11	Ħ		u	_
Surr: Fluorene-d10	42.8 %	· 40-150		•				٠.	

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Project Number: na

Reporting

907.334.9200 fax 907.334.9210

Portland, OR 97224

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

Project: MarineFin-1-01

North Creek Analytical - Portland

	Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
EiC.A	B-2 (7-9) (P3C0737-02) Soil					Sampled: 03/24	4/03 Rece	ived: 03/25/	03	R-05
圖	Surr: Pyrene-d10	41.3 %	40-150							
	Surr: Benzo (a) pyrene-d12	40.2 %	40-150							
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		,					1 00/05/	00	
116	B-1 (17-18) (P3C0737-03) Soil					Sampled: 03/2	4/03 Rece	ived: 03/25/		
	Acenaphthene	ND	40.2	u g/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	R-03
	Acenaphthylene	ND	13.4	19	"	**	*	n	н	
	Anthracene	ND	13.4	11	"	**	**	*	"	
	Benzo (a) anthracene	20.4	13.4	Ħ	11	"	. 17	11	19	
	Benzo (a) pyrene	17.1	13.4	11	IF	**	Ħ	11	15	
	Benzo (b) fluoranthene	18.5	13.4	H*	**	Ħ	#	H	U	
	Ranzo (ghi) perviene	18.6	13.4	**	11	**	H	*	17	
	Benzo (k) fluoranthene	ND	13.4	н	11	п	Ħ	**	н	
	Chrysene	24.6	13.4	n	**	11	ŧI	87	11	
েকুর	Dibenzo (a,h) anthracene	ND	13.4	**	"	н	11	n	n	
	Fluoranthene	76.0	13.4	*	11	11	н	14	# "	
	Fluorene	14.2	13.4	u	11	11	10	н	17	
	Indeno (1,2,3-cd) pyrene	ND	13.4	n	*	н	**	**	**	
	Naphthalene	ND	13.4	10	**	"	¥	"	H	
	Phenanthrene	83.0	13.4		11	10	. "	47	н	
1.7674	Pyrene	72.8	13.4	n .	Ħ	Ħ	11	#	#	
	Surr: Fluorene-d10	72.7 %	40-150							
	Surr: Pyrene-d10	60.5 %	40-150							
ESCI	Surr: Benzo (a) pyrene-d12	50.1 %	40-150							
e proje								. 1 00/05/	0.3	
	MW-1 (8-9) (P3C0737-04) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/		
EMU	Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
	Acenaphthylene	ND	13.4	11	н	*	*	"	17	
1	Anthracene	ND	13.4	**	11	н .	•	**	11	
1	Benzo (a) anthracene	24.8	13.4	*	11	#	**	. "	۳.	
	Benzo (a) pyrene	29.5	13.4	10	*	tf	Ħ	11	n	
ЖÇ.	Benzo (b) fluoranthene	21.9	13.4	*	s t	н	Ħ	#	11	
#	Benzo (ghi) perylene	26.2	13.4	n	*	Ħ	H	**	U	÷
	Benzo (k) fluoranthene	18.8	13.4	17	u	Ħ	н	**	•	
	Chrysene	32.5	13.4	n	**	н	n	** .	**	
Will.	Dibenzo (a,h) anthracene	ND	. 13.4	. "	*	**	H	1)	Ħ	
	Fluoranthene	49.2	13.4	н	H	н	н	n .	ø	
	Fluorene	ND	13.4	18	н		н	н	*	
W	Indeno (1,2,3-cd) pyrene	19.2	13.4	₹V.	n .	. #	н			•

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GeoDesign

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Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (8-9) (P3C0737-04) Soil					Sampled: 03/2	1/03 Recei	ived: 03/25/	03	
	ND	. 13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
Naphthalene Phenanthrene	42.8	13.4	"	11.	н	H	**	**	
Pyrene	61.6	13.4	"	#	н	# .	11		
Surr: Fluorene-d10 Surr: Pyrene-d10	93.2 %	40-150							
Surr: Purene-d10	85.6 %	40-150							
Surr: Benzo (a) pyrene-d12	83.5 %	40-150							
MW-2 (18-20) (P3C0737-05) Soil				ļ	Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/07/03	3040110	
Acenaphthylene	ND	13.4	"	**	11	H	11	**	
	ND	13.4	"		н	11	н	H	
Anthracene Benzo (a) anthracene	ND	13.4	41	44	n	**	11	11	
Benzo (a) pyrene	ND	13.4	"	H	11	11	**	. #	
Benzo (b) fluoranthene	ND	13.4		**	11	**	н	**	
Benzo (ghi) perylene	ND	13.4	**		*	**	81	"	
Benzo (k) fluoranthene	ND	13.4	*	n	•	ıı	11		
Chrysene	ND	13.4	*1	**			**	•	
Dibenzo (a,h) anthracene	ND	13.4	Ħ			**	**	•	
Fluoranthene	ND	13.4	**	, н	19	"	"	11	
Fluorene	ND	13.4	Ħ	Ħ		Ħ	**	*	
Indeno (1,2,3-cd) pyrene	ND	13.4	**	"	•	Ħ	**	•	
Indeno (1,2,3-cd) pyrene Naphthalene	ND	13.4	#	n	Ħ	**	U	*	
Phenanthrene	ND	13.4	. 11	#	n	#	••	н	
5	ND	13.4	н .	*	H		H	н	
Surr: Fluorene-d10	54.0 %	40-150							
Surr: Pyrene-d10	48.4 %	40-150							
Surr: Benzo (a) pyrene-d12	17.7 %	40-150				•			S-09

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GeoDesign Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone Portland, OR 97224

Reported: 04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

Project Number: na

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (23-25) (P3C0737-06) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
Acenaphthene Acenaphthylene	ND	13.4	"	*	"	#	#	n	
Anthracene	ND	13.4	u	**	. "	H	11	Ħ	
Benzo (a) anthracene	ND	13.4	17	*		11	**	#	
Benzo (a) pyrene	ND	13.4	11	**	*	u u	H	**	
Benzo (b) fluoranthene	ND	13.4		#	**	**	4	11	
Benzo (ghi) perylene	ND	13.4	n	11	**	"	H	•	
Benzo (k) fluoranthene	ND	13.4	n n	H	11	**	•	11	
Chrysene	ND	13.4	n	"	11	"	**	11	
Dibenzo (a,h) anthracene	ND	13.4	t\$	**	**	**	"	**	
Fluoranthene	ND	13.4	11	11	n	11	**	Ħ	
Fluorene	ND	13.4	"	н	er .	**	"	ά	
Indeno (1,2,3-cd) pyrene	ND	13.4	19	н	11	11	11	и	
Nanhthalene	ND	13.4	t t	*	Ħ	u	н	Ħ	
Phenanthrene	ND	13.4	H	*	n	**	u	и	
Pyrene	ND	13.4	19	19	11	н	u u	*	
Surr: Fluorene-d10	53.9 %	40-150				······································			
Surr: Pyrene-d10	54.0 %	40-150							
Surr: Benzo (a) pyrene-d12	48.5 %	40-150							
•					a 1 1 0 m m	1 /02 - 7		0.2	
MW-3 (19-20) (P3C0737-07) Soil					Sampled: 03/2		ived: 03/25/		
Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
Acenaphthylene	ND	13.4	11	11	re	**	**	*	
Anthracene	ND	13.4	**	н	u	#	"	11	
Anthracene Benzo (a) anthracene	ND	13.4	#	н		**	н	н	
Benzo (a) pyrene	ND	13.4	n	11	**	n	н	v	
Benzo (b) fluoranthene	ND	13.4	п	"	*	10	и	u	
	ND	13.4	н	17	**	11	H	v	
Benzo (ghi) perylene Benzo (k) fluoranthene	ND	13.4	н	*	,	11	**	u	
Chrysene	ND	13.4	н	•	n		11	W	
	ND	13.4	и	*	**	H	*	n	
Dibenzo (a,h) anthracene Fluoranthene	ND	13.4	H	**	н	11	н	n	
Fluorene	ND	13.4	H	"	**	H	**	H	
Indeno (1,2,3-cd) pyrene	· ND	. 13.4	н	**	Ħ	**	**	#	
	ND	13.4		"	IT	77	**	и .	
Naphthalene Phenanthrene	ND	13.4	Ħ	H	•	"	21	11	
Pyrene	ND	13.4	#	4	11	H		*	
Surr: Fluorene-d10	45.5 %	40-150							

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Project: MarineFin-1-01

3209 Denali Street, Anchorage, Af

Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

	Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
	MW-3 (19-20) (P3C0737-07) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
	Surr: Pyrene-dl0	44.9 %	40-150							
	Surr: Pyrene-d10 Surr: Benzo (a) pyrene-d12	40.6 %	40-150							
	· / / 2 /									
20	MW-4 (18-19) (P3C0737-08) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	·
	Acenaphthene	15.9	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
	Acenaphthylene	ND	13.4	17	#	**	n .	н	Ħ	
[79]	Anthracene	ND	13.4	11	н	*	**	19	et	
	Benzo (a) anthracene	43.4	13.4	11	н	•	*	Ħ	н	
HANN!	Benzo (a) pyrene	59.7	13.4	10	н	**	11	#		
-	Benzo (b) fluoranthene	35.5	13.4	н	н	*	"	11	н	
	Benzo (ghi) perylene	62.6	13.4	н	u	"	17		#	
	Benzo (k) fluoranthene	41.5	13.4	11	4	**	11	*	H	
	Chrysene	55.6	13.4	. "	*	•	**	**	#	
	Dibenzo (a,h) anthracene	ND	13.4	п	"	*	**	H	**	
l d	Fluoranthene	51.5	13.4	**	11	*	"	*1	Ħ	
ñ. 3	Fluorene	14.3	13.4	10	н	*	"	**	п	
67.0	Indeno (1,2,3-cd) pyrene	43.2	13.4	**	*	41	**	11	#	
	Naphthalene	ND	13.4	11	H	#	•	11	**	
į,	Phenanthrene	27.0	13.4	11	41	**	#	II		
	Pyrene	102	13.4	n	н	H	*			
	Surr: Fluorene-d10	60.9 %	40-150							
	Surr: Pyrene-d10	55.1 %	40-150							
	Surr: Benzo (a) pyrene-d12	<i>56.0 %</i>	40-150							
	MW-5 (22-23) (P3C0737-09) Soil				;	Sampled: 03/2	1/03 Recei	ived: 03/25/	03	
900	Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
	Acenaphthylene	ND	13.4	"		# #	#	H	H	
		ND	13.4	п	W	н	**	И	и	
101.18	Benzo (a) anthracene	35.4	13.4	17		n	.	**	н	
	Benzo (a) pyrene	57.9	13.4	н	n	"	n	w	H	
	Benzo (b) fluoranthene	32.4	13.4	n	ts		v	11	II .	
	Benzo (ghi) perylene	57.9	13.4	H	n	**	11	*	H	
	Benzo (k) fluoranthene	34.8	13.4	*	"	**	11	11	H	
	Chrysene	47.3	13.4	**	n	**	**	#	tr .	
	Dibenzo (a,h) anthracene	ND	13.4	, н	*	10		**	H	
	Fluoranthene	88.8	13.4	н	n	#		٠.	Ħ	
	Fluorene	ND	13.4	*	Ħ	**	H	M	M	
	Indeno (1,2,3-cd) pyrene	38.8	13.4	n	*	H .	**	"		
纖	- (-)-3) E1.									

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Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Number: na

Project Manager: Paul Trone

Reported:

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Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

	Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
	MW-5 (22-23) (P3C0737-09) Soil					Sampled: 03/2	1/03 Rece	ived: 03/25/	03	
	Naphthalene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/08/03	3040110	
Sept.	Phenanthrene	- 38.6	13.4	#	**	#	Ħ	16	11	
	Pyrene	137	13.4	**	n	Ħ	n	11	#	
	Surr: Fluorene-d10	57.5 %	40-150							
loge.	Surr: Pyrene-d10	57.4 %	40-150							
	Surr: Benzo (a) pyrene-d12	51.5 %	40-150							
	MW-6 (13-15) (P3C0737-10) Soil					Sampled: 03/2	1/03 Recei	ved: 03/25/	03	R-05
11.54	Acenaphthene	ND	26.8	ug/kg dry	2	EPA 8270m	04/03/03	04/07/03	3040110	
- T-1	Acenaphthylene	ND	26.8	н	**	H	11	II .	•	
	Anthracene	ND	26.8	**	**	Ħ	H	11	н	
12/2	Benzo (a) anthracene	70.2	26.8	н	n	Ħ	"	11	**	
	Benzo (a) pyrene	124	26.8	11	H	u		Ħ	11	
100	Benzo (b) fluoranthene	85.2	26.8	Ħ	**	Ħ	#	#	н	
1	Benzo (ghi) perylene	149	26.8	**	**	H	#	*	10	
	Benzo (k) fluoranthene	71.4	26.8		**	If	n	**	**	
5779	Chrysene	98.5	26.8	11	e	н	11	н	**	
	Dibenzo (a,h) anthracene	ND	26.8	н	11	#	"	n	•	
Lie	Fluoranthene	137	26.8	**	**	n	**	**	*	
	Fluorene	ND	26.8	21	#	н	16	п	н	
	Indeno (1,2,3-cd) pyrene	100	26.8	11	н	н	"	н	**	
	Naphthalene	ND	26.8	11 ,	н	*	18	n	**	
	Phenanthrene	60.7	26.8	**	n		11	**	*	
EWI	Pyrene	169	26.8	н	14	Ħ	#	11	п	
	Surr: Fluorene-d10	55.9 %	40-150							
F-16.	Surr: Pyrene-d10	51.3 %	40-150							
雅	Surr: Benzo (a) pyrene-d12	49.7 %	40-150							

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Reported:

Project Number: na

Project Manager: Paul Trone

04/18/03 12:13

Polynuclear Aromatic Compounds per EPA 8270M-SIM

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (14-15) (P3C0737-11) Soil					Sampled: 03/2	1/03 Recei	ved: 03/25/	03	
Acenaphthene	ND	13.4	ug/kg dry	1	EPA 8270m	04/03/03	04/07/03	3040110	
Acenaphthylene	. ND	13.4	n	*	0	н	11	11	
Anthracene	ND	13.4	11	11	п	•	**	H	
Benzo (a) anthracene	ND	13.4	H	н	"	"	н	58	
	ND	13.4	n		•	"	"	**	
Benzo (a) pyrene Benzo (b) fluoranthene	ND	13.4	•	· n	н '	*	**	н	
Benzo (ghi) perylene	ND	13.4	•	"	it.	**	11	н	
Benzo (k) fluoranthene	ND	13.4	11	**	H ·	•	**	Ħ	
	ND	13.4			**	*	11	#	
Chrysene	ND	13.4	11	**		*		**	
Dibenzo (a,h) anthracene	ND	13.4	11		•	10	**	19	
Fluoranthene	ND	13.4	*	11	n	n	H	, **	
Fluorene	ND	13.4	н		11	11	11		
Indeno (1,2,3-cd) pyrene		13.4	"	"	H	#		**	
Naphthalene	ND	13.4	11	11	•	19	19		
Phenanthrene Pyrene	ND	13.4	19	u	11		и	16	
Pyrene Pyrene	ND								
Surr: Fluorene-d10	85.4 %	40-150							
Surr: Pyrene-d10	86.3 %	40-150							
Surr: Benzo (a) pyrene-d12	80.0 %	40-150							

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Project Number: na
Project Manager: Paul Trone

Reported:

04/18/03 12:13

Percent Dry Weight (Solids) per Standard Methods North Creek Analytical - Portland

	Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
	B-1 (8-10) (P3C0737-01) Soil				`	Sampled: 03/24/	03 Rece	ived: 03/25/0)3	·
	% Solids	87.7	1.00 %	6 by Weight	1	NCA SOP	03/31/03	04/01/03	3031015	
12749	B-2 (7-9) (P3C0737-02) Soil					Sampled: 03/24/	03 Rece	ived: 03/25/)3	
	% Solids	76.4	1.00 %	% by Weight	1	NCA SOP	03/31/03	04/01/03	3031015	
60.74	B-1 (17-18) (P3C0737-03) Soil					Sampled: 03/24/	03 Rece	ived: 03/25/	03	
100 miles	% Solids	90.2	1.00 9	% by Weight	1	NCA SOP	03/31/03	04/01/03	3031015	
9/30	MW-1 (8-9) (P3C0737-04) Soil					Sampled: 03/21/	03 Rece	ived: 03/25/	03	
	% Solids	70.8	1.00	% by Weight	1	NCA SOP	03/31/03	04/01/03	3031015	
i,						Sampled: 03/21/	03 Rece	ived: 03/25/	03	
	MW-2 (18-20) (P3C0737-05) Soil % Solids	81.3	1.00	% by Weight	1	NCA SOP	03/31/03	04/01/03	3031015	
4						Sampled: 03/21	/03 Rece	eived: 03/25/	03	
	MW-2 (23-25) (P3C0737-06) Soil % Solids	77.3	1.00	% by Weight	1	NCA SOP	03/31/03	04/01/03	3031015	
The second	7 457 2 (10 20) (P2C0727 07) Soil					Sampled: 03/21	/03 Rece	eived: 03/25/	03	
- N	MW-3 (19-20) (P3C0737-07) Soil % Solids	87.6	1.00	% by Weight	1	NCA SOP	03/31/03	04/01/03	3031015	
	North 4 (40, 40) (D2C0027, 00) Coll					Sampled: 03/21	/03 Reco	eived: 03/25/	03	
175	MW-4 (18-19) (P3C0737-08) Soil % Solids	85.4	1.00	% by Weight	1	NCA SOP	03/31/03	04/01/03	3031015	
	CONT. T. (22, 22) (D2CDE2E 00) Sell					Sampled: 03/21	/03 Rec	eived: 03/25	03	
	MW-5 (22-23) (P3C0/3/-09) Son	80.0	1.00	% by Weight	t 1	NCA SOP	03/31/03	04/01/03	3031015	

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Portland, OR 97224

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Percent Dry Weight (Solids) per Standard Methods North Creek Analytical - Portland

Project: MarineFin-1-01

Analyte	Result	Reporting Limit Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-6 (13-15) (P3C0737-10) Soil			5	Sampled: 03/2	21/03 Rece	ived: 03/25/0	03	
% Solids	79.1	1.00 % by Weight	1	NCA SOP	03/31/03	04/01/03	3031015	
MW-1 (14-15) (P3C0737-11) Soil			5	Sampled: 03/2	1/03 Rece	ived: 03/25/0	03	
% Solids	84.8	1.00 % by Weight	1	NCA SOP	03/31/03	04/01/03	3031015	

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Project MarineFin-1-01
Project Number: na

907.334.9200 fax 907.334.9210 Reported:

Portland, OR 97224

Project Manager: Paul Trone

04/18/03 12:13

	Nor	th Creek	Analyti	cal - Po	ortland			···········		
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3030967 - EPA 3550 Fuels										
Blank (3030967-BLK1)				Prepare	d & Analy	zed: 03/3	1/03			
Dingel Bongs Organics	ND	25.0	mg/kg							
Heavy Oil Range Hydrocarbons	ND	50.0	†I							
Surr: 1-Chlorooctadecane	4.54		"	4.80		94.6	50-150			
LCS (3030967-BS1)				Prepare	d & Analy	zed: 03/3	1/03			
Diesel Range Organics	116	25.0	mg/kg	125		92.8	50-150			
Heavy Oil Range Hydrocarbons	67.2	50.0	n	75.0		89.6	50-150			
Surr: 1-Chlorooctadecane	4.07		"	4.80		84.8	50-150			
Duplicate (3030967-DUP1)	Sou	rce: P3C07:	37-01	Prepare	d & Analy	zed: 03/3	1/03			
Diesel Range Organics	25.1	25.0	mg/kg dry		31.7			23.2	50	
Heavy Oil Range Hydrocarbons	ND	50.0	Ħ		57.6			22.0	50	
Surr: 1-Chlorooctadecane	5.46		н	5.47		99.8	50-150			
Duplicate (3030967-DUP2)	Sou	rce: P3C07	37-02	Prepare	d & Analy	zed: 03/3	1/03			
Diesel Range Organics	ND	25.0	mg/kg dry		ND				50	
Heavy Oil Range Hydrocarbons	ND	50.0	**		ND				50	
Surr: 1-Chlorooctadecane	5.46		н	6.28		86.9	50-150			

North Creek Analytical - Portland

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Project: MarineFin-1-01

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Project Number: na

907.334.9200 fax 907.334.9210

Reported: 04/18/03 12:13

Project Manager: Paul Trone

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 3030870 - EPA 3050			· 							
Blank (3030870-BLK1)		•		Prepare	d: 03/26/0	3 Analyz	ed: 03/27/0)3		
Arsenic	ND	0.500	mg/kg							
Beryllium	ND	0.500	11							
Cadmium	ND	0.500	*		,					
Chromium	ND	0.500	"							
Copper	ND	2.00	•							
Lead	ND	0.500	"							
Nickel	ND	1.00	**							
Selenium	ND	0.500	11							
Zinc	ND	2.00	n							
LCS (3030870-BS1)				Prepare	d: 03/26/0	3 Analyz	ed: 03/27/0)3		
Arsenic	11.7	0.500	mg/kg	10.0		117	80-120			
Beryllium	11.5	0.500		10.0		115	80-120			
Cadmium	11.4	0.500	и	10.0		114	80-120			
Chromium	11.8	0.500	*	10.0		118	80-120			
Copper	10.4	2.00		10.0		104	80-120			
Lead	9.02	0.500	Ħ	10.0		90.2	80-120			
Nickel	11.9	1.00	н	10.0		119	80-120			
Selenium	12.0	0.500	11	10.0		120	80-120			
Zinc	10.9	2.00	н	10.0		109	80-120			
Duplicate (3030870-DUP1)	Soi	urce: P3C07	84-21	Prepare	d: 03/26/0	3 Analyz	ed: 03/27/0	03		
Arsenic	3.73	0.373	mg/kg dry		4.01			7.24	40	
Beryllium	0.573	0.373	*		0.667			15.2	40	
Cadmium	ND	0.373	Ħ		ND				40	
Chromium	18.8	0.373	11		18.9			0.531	40	
Соррег	26.0	1.49			17.9			36.9	40	
Lead	15.2	0.373	*		27.6			57.9	40	Q-1
Nickel	14.5	0.746	n		14.2			2.09	40	
Selenium	ND	0.373	Ħ		ND				40	
Zinc	. 109	1.49	H		105			3.74	40	

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project Number: na

Project: MarineFin-1-01

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3030870 - EPA 3050					·····					
Matrix Spike (3030870-MS1)	So	urce: P3C07	84-21	Prepare	d: 03/26/0	3 Analyz	ed: 03/27/0)3		
Arsenic	11.7	0.376	mg/kg dry	8.81	4.01	87.3	75-125			
Beryllium	9.16	0.376	н	8.81	0.667	96.4	75-125			
admium	8.36	0.376	H	8.81	ND	94.9	75-125			
Chromium	26.1	0.376	14	8.81	18.9	81.7	75-125			
Copper	25.3	1.50	*	8.81	17.9	84.0	75-125			
Lead	21.0	0.376	"	8.81	27.6	-74.9	75-125			Q-
Nickel	22.1	0.752	ŧ	8.81	14.2	89.7	75-125			
Selenium	8.67	0.376	**	8.81	ND	98.4	75-125			
	99.8	1.50	11	8.81	105	-59.0	75-125			Q-
Zine Matrix Spike (3030870-MS2)	So	urce: P3C07	84-30	Prepare	d: 03/26/0	3 Analyz	ed: 03/27/0)3		
Arsenic	12.5	0.391	mg/kg dry	8.91	3.77	98.0	75-125			
Beryllium	10.2	0.391	п	8.91	0.527	109	75-125			
Cadmium	9.04	0.391	**	8.91	ND	101	75-125			
Chromium	29.5	0.391	11	8.91	17.5	135	75-125			Q-
a Copper	23.0	1.56	n	8.91	12.0	123	75-125			
7	13.6	0.391	H	8.91	6.23	82.7	75-125			
Lead Nickel	24.1	0.781	n	8.91	12.6	129	75-125			Q-
Selenium	9.10	0.391	#	8.91	0.455	97.0	75-125			
Zinc	77.8	1.56	ti.	8.91	60.2	198	75-125			Q-
Batch 3031013 - EPA 7471		·		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						
Blank (3031013-BLK1)				Prepare	d & Analy	yzed: 03/3	1/03			
Blank (3031013-BLK1) Mercury	ND	0.100	mg/kg							
LCS (3031013-BS1)			·	Prepare	d & Analy	yzed: 03/3	1/03			
Mercury	1.07	0.100	mg/kg	1.00		107	80-120			

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Reported:

Portland, OR 97224

GeoDesign

Project Number: na

Project Manager: Paul Trone

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04/18/03 12:13

		h Creek			Source		%REC		RPD	
Analyte	Result	Reporting Limit	Units	Spike Level	Result	%REC	Limits	RPD	Limit	Notes
	Result	Lint	Olitis	10101	100000	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
Batch 3031013 - EPA 7471								 		
Duplicate (3031013-DUP1)	Sour	ce: P3C05	05-27	Prepare	d & Analy	zed: 03/3	1/03			
Mercury	ND	0.100	mg/kg dry		ND				40	
Matrix Spike (3031013-MS1)	Sour	ce: P3C05	05-27	Prepare		zed: 03/3				
Mercury	1.11	0.0862	mg/kg dry	1.08	ND	103	75-125			
Batch 3040095 - EPA 3050										
Blank (3040095-BLK1)				Prepare	d: 04/02/0	3 Analyz	ed: 04/03/0)3		
	ND	0.500	mg/kg	1						
n Silver	ND	0.500	U							
Antimony Silver Thallium	ND	0.500	."						•	
LCS (3040095-BS1)				Prepare	d: 04/02/0	3 Analyz	ed: 04/03/0)3		
	5.05	0.500	mg/kg	5.00		101	80-120			
Antimony Silver	5.06	0.500	u	5.00		101	80-120			
Thallium	4.86	0.500	n	5.00		97.2	80-120			
Duplicate (3040095-DUP1)	Sou	rce: P3D00	043-18	Prepare	d: 04/02/0	3 Analyz	ed: 04/03/	03		
Antimony	ND	0.500	mg/kg dry		0.123			3.31	40	
Silver	ND	0.500	**		0.0700			6.79	40	
	ND	0.500	#		ND				40	
Thallium Matrix Spike (3040095-MS1)	Sou	rce: P3D00	043-18	Prepare			zed: 04/03/	03		
Antimony	2.13	0.439	mg/kg dry	5.32	0.123	37.7	75-125			Q-
•	5.41	0.439	u	5.32	0.0700	100	75-125			
Silver Thallium	5.38	0.439	H	5.32	ИД	101	75-125			

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Number: na

Project Manager: Paul Trone

Reported:

04/18/03 12:13

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											3
,			Reporting		Spike	Source		%REC		RPD	į
	Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
	12 11 11 11 11 11 11 11 11 11 11 11 11 1										

Baten 3040095 - EFA 3030									
Matrix Spike (3040095-MS2)	Sour	ce: P3D0043	-19	Prepare	:d: 04/02/03	Analyz	zed: 04/03/03		
Antimony	1.38	0.385 m	g/kg dry	4.60	0.0659	28.6	75-125	Q-	-02
•	4.40	0.385	Ħ	4.60	0.0701	94.1	75-125		
Silver Thallium	4.27	0.385	n ·	4.60	ND	92.8	75-125		

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Project: MarineFin-1-01

Project Manager: Paul Trone

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		Nor	th Creek	<u>Analyt</u>	<u>ical - Po</u>	ortland						٦
	nalyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Ь	atch 3030797 - EPA 5035											

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Note
Batch 3030797 - EPA 5035										
Blank (3030797-BLK1)				Prepare	d: 03/25/0	3 Analyz	ed: 03/28/0)3		·
	ND	2500	ug/kg	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		-				
Acetone	ND	100	**				•			
Benzene Bromobenzene	ND	100								
Bromochloromethane	ND	100	**							
Bromodichloromethane	ND	100	**							
Bromoform	ND	100	н							
Bromomethane	ND	500	u							
2-Butanone	ND	1000	#							
	ND	500	*							
1	ND	100	•							
sec-Butylbenzene tert-Butylbenzene	ND	100	11							
Tert-Butytoenzene - Carbon disulfide	ND	1000	11							
Carbon tetrachloride	ND	100	**							
Chlorobenzene	ND	100								
Chloroethane	ND	100								
Chloroform	ND	100	H							
Chloromethane	ND	500								
2-Chlorotoluene	ND	100	н							
•	ND	100	17							
4-Chlorotoluene 1,2-Dibromo-3-chloropropane	ND	500	10							
Dibromochloromethane	ND	100	**							
	ND	100	н							
1,2-Dibromoethane	ND	100	н							
Dibromomethane	ND	100	*							
. ,2 5.0	ND	100	Ħ							
1,3-Dichlorobenzene	ND .	100	и							
1,4-Dichlorobenzene Dichlorodifluoromethane	ND .	500	**							
	ND	100	19							
1,1-Dichloroethane	ND	100	#							
1,2-Dichloroethane	ND	100	н							
1,1-Dichloroethene cis-1,2-Dichloroethene	ND	100	н							
	. ND	100	**							
trans-1,2-Dichloroethene	ND	100	. *				•			
1,2-Dichloropropane	ND	100	*	-						
	ND	100	**							
2,2-Dichloropropane	ND	100	н							
1,1-Dichloropropene	מא	100			<u> </u>					

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Portland, OR 97224

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907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Project Number: na

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		1101	CAA COT U TAR								1
			Reporting		Spike	Source		%REC		RPD	1
	Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
:://3	mayto	· · · · · · · · · · · · · · · · · · ·									

Batch 3030797 - EPA 5035						1 00 (00 (00	
Blank (3030797-BLK1)		·		Prepared: 03/2	25/03 Analy2	zed: 03/28/03	
cis-1,3-Dichloropropene	ND	100	ug/kg				
trans-1,3-Dichloropropene	ND	100	"				
Ethylbenzene	ND	100	*				
Hexachlorobutadiene	ND	200	**				
2-Hexanone	ИD	1000	11				
Isopropylbenzene	ND	200	**				
p-Isopropyltoluene	ND	200	"				
4-Methyl-2-pentanone	ND	500	*1				
Methyl tert-butyl ether	ND	100	n				
Methylene chloride	ND	500	ti-				
Naphthalene _	ND	200	Ħ				
n-Propylbenzene	ND	100	Ħ			•	
Styrene	ND	100	*				
1,1,2-Tetrachloroethane	ND	100	**			44	
1,1,2,2-Tetrachloroethane	ND	100	*				
Tetrachloroethene	ND	100	**				
Toluene	ND	100	10				
1,2,3-Trichlorobenzene	ND	100	#				
11,2,4-Trichlorobenzene	ND	100	Ħ				
1,1,1-Trichloroethane	ND	100	. "				
1,1,2-Trichloroethane	ND	100	17				
Trichloroethene	ND	100	11				
Trichlorofluoromethane	ND	100	Ħ				
Trichlorofluoromethane 1,2,3-Trichloropropane	ND	100	*				
1,2,4-Trimethylbenzene	ND	100	10		,		
1,3,5-Trimethylbenzene	ND	100	и				
Vinyl chloride	ND	100	**		•		
o-Xylene	ND	100	10				
m,p-Xylene	ND	200	Ħ				
Surr: 4-BFB	. 1910		"	. 2000	95.5	65.4-143	
Surr: 1,2-DCA-d4	2140		"	2000	107	77.7-144	
Surr: Dibromofluoromethane	2050		*	2000	102	66.5-131	
Surr: Toluene-d8	2040		- 11	2000	102	77.5-143	

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14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Manager: Paul Trone

Project Number: na

907.334.9200 fax 907.334.9210

Reported:

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	ត្បីស្ត្រាត់ ខែក្រើប្រជាព	erossiaiak ja	គេ ព្រំប្រ	bizifelik	1,02,31016)	engih	ir Chillin			
# 3 Example 1		h Creek								
		Reporting		Spike	Source		%REC		RPD	N 7
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 3030797 - EPA 5035					1				,	
LCS (3030797-BS1)				Prepare	d: 03/25/0	3 Analyz	ed: 03/28/0	3		
Benzene	2500	100	ug/kg	2500		100	81.9-120			
- Chlorobenzene	2400	100	11	2500		96.0	79.2-120			
1,1-Dichloroethene	2380	100	**	2500		95.2	66.1-120			
Toluene	2430	100	**	2500		97.2	80-120			
Trichloroethene	2300	100	11	2500		92.0	76-120			
Surr: 4-BFB	1870		"	2000		93.5	65.4-143			
Surr: 1,2-DCA-d4	2160		"	2000		108	77.7-14 4			
Surr: 1,2-DCA-u4 Surr: Dibromofluoromethane	2040		n	2000		102	66.5-131			
Surr: Dibromojiuoromeinune Surr: Toluene-d8	2030		n	2000		102	77.5-143			
Matrix Spike (3030797-MS1)	Sou	rce: P3C06	92-05	Prepare	d: 03/25/0	3 Analyz	zed: 03/28/0	3		
Benzene	2560	100	ug/kg dry	2670	13.9	95.4	68.5-120			
Chlorobenzene	2470	100	"	2670	17.1	91.9	65.9-120			
1,1-Dichloroethene	2420	100	II	2670	ND	90.6	55.8-120			
Toluene	2490	100	**	2670	18.1	92.6	70.3-120			
Titchloroethene	2320	100	*	2670	14.9	86.3	65.5-125			
Surr: 4-BFB	1990		м	2130		93.4	65.4-143			
Surr: 1,2-DCA-d4	2130		"	2130		100	77.7-144			
Surr: Dibromofluoromethane	2020		n	2130		94.8	66.5-131			
Surr: Divromojaviometaline Surr: Toluene-d8	2070		n	2130		97.2	77.5-143			
Matrix Spike Dup (3030797-MSD1)	Son	rce: P3C06	192-05	Prepare	ed: 03/25/0	3 Analy	zed: 03/28/0)3		
Benzene	2530	100		2670	13.9	94.2	68.5-120	1.18	25	
Chlorobenzene	2470	100	#	2670	17.1	91.9	65.9-120	0.00	25	
Chloropenzene 1,1-Dichloroethene	2430	100	**	2670	ND	91.0	55.8-120	0.412	25	
	2480	100	er	2670	18.1	92.2	70.3-120	0.402	25	
Toluene Trichloroethene	2310	100	н	2670	14.9	86.0	65.5-125	0.432	25	
	1930		-	2130		90.6	65.4-143			
Surr: 4-BFB	2140		н	2130		100	77.7-144			
Surr: 1,2-DCA-d4	2040		u	2130		95.8	66.5-131			
Surr: Dibromofluoromethane			"	2130		97.2	77.5-143			
Surr: Toluene-d8	2070			21,70		- · · · ·				

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Portland, OR 97224

Project: MarineFin-1-01

Project Number: na

907.334.9200 fax 907.334.9210

Project Manager: Paul Trone

Reported:

04/18/03 12:13

Analyte		h Creek Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Analyte	Result	Limit	Onits	ESTOI						
Batch 3040110 - EPA 3550										
Blank (3040110-BLK1)				Prepare	d: 04/03/03	3 Analyz	ed: 04/07/	03		
	ND	13.4	ug/kg							
Acenaphthylene	ND	. 13.4	tt							
Acenaphthene Acenaphthylene Anthracene	ND	13.4	11							
Benzo (a) anthracene	ND	13.4	17							
Benzo (a) pyrenė	ND	13.4	11						•	
Benzo (b) fluoranthene	ND	13.4								
Benzo (ghi) perylene	ND	13.4	п							
Benzo (k) fluoranthene	ND	13.4								
Chrysene	ND	13.4	#							
Dibenzo (a,h) anthracene	ND	13.4	*							
Fluoranthene	ND	13.4	et					,		
Fluorene	. ND	13.4	Ħ							
Indeno (1,2,3-cd) pyrene	ND	13.4	*							
Naphthalene	ND	13.4	11							
Phenanthrene	ND	13.4	n							
Pyrene	ND	13.4	#1							
	69.2		n	83.3		83.1	40-150			
Surr: Fluorene-d10	71.9		"	83.3		8 6.3	40-150			
Surr: Pyrene-d10 Surr: Benzo (a) pyrene-d12	66.0		*	83.3		79.2	40-150			
Surr: Benzo (a) pyrene-d12	00.0							.aa		
LCS (3040110-BS1)					ed: 04/03/0			/03		
Acenaphthene	135	13.4	ug/kg	167		80.8	33-139			
Benzo (a) pyrene	138	13.4	n	167		82.6	45-149			
Pyrene	121	13.4	11	167		72.5	39-138			
	71.7		n	83.3		86. I	40-150			
Surr: Fluorene-d10	71.5		"	83.3	•	85.8	40-150			
Surr: Pyrene-d10 Surr: Benzo (a) pyrene-d12	70.8		"	83.3		85.0	40-150			

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GeoDesign

14945 SW Sequoia Parkway, Suite 170

Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Number: na

Reported:

Portland, OR 97224

Project Manager: Paul Trone

04/18/03 12:13

	Nor			Spike	Source		%REC		RPD	
Analyte	Result	Reporting Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 3040110 - EPA 3550										
Matrix Spike (3040110-MS1)	Sou	rce: P3C07	37-01	Prepare	d: 04/03/0	3 Analyz	ed: 04/07/0)3		R-(
	136	26.8	ug/kg dry	190	45.3	47.7	33-139			
Acenaphthene	264	26.8	*	190	114	78.9	45-149			
Benzo (a) pyrene	422	26.8	•	190	327	50.0.	39-138			
Acenaphthene Benzo (a) pyrene Pyrene Surre Elizavere d10	48.2			95.0	· · · · · · · · · · · · · · · · · · ·	50.7	40-150			
Surr. Plubrene-uro	44.8		,,	95.0		47.2	40-150			
Surr: Pyrene-d10 Surr: Benzo (a) pyrene-d12	43.9		n	95.0		46.2	40-150			
	So	arce: P3C07	37-01	Prepare	d: 04/03/0	3 Analyz	ed: 04/07/0)3	·	R-
Matrix Spike Dup (3040110-MSD1)	144	26.8	ug/kg dry	190	45.3	51.9	33-139	5.71	60	
Acenaphthene	225	26.8	"	190	114	58.4	45-149	16.0	60	
Benzo (a) pyrene Pyrene	419	26.8	. #	190	327	48.4	39-138	0.713	60	
	51.6		"	95.0		54.3	40-150			
Surr: Fluorene-d10	46.7		H	95.0		49.2	40-150			
Surr: Pyrene-d10 Surr: Benzo (a) pyrene-d12	45.3		#	95.0		47.7	40-150			

North Creek Analytical - Portland

Philip Neverberg

The results in this report apply to the samples analyzed in accordance with the chain custody document. This analytical report must be reproduced in its entirety.

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Page 32 of 34

Philip Nerenberg, Laboratory Manager



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503.906.9200 fax 503.906.9210 Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541,383,9310 fax 541,382,7588

GeoDesign

14945 SW Sequoia Parkway, Suite 170

3209 Denail Street, Anchorage, A 907.334.9200 fax 907.334.9210

Project Number: na

Reported:

Portland, OR 97224

Project Manager: Paul Trone

Project: MarineFin-1-01

04/18/03 12:13

NA ELECTRICAL PROPERTY OF THE	Nor	th Creek Analytic	cal - Po	ortland					
Analyte	Result	Reporting Limit Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3031015 - Dry Weight Duplicate (3031015-DUP1)									
Duplicate (3031015-DUP1)	Sou	rce: P3C0737-01	Prepare	d: 03/31/03	Analyz	ed: 04/01/	03		
% Solids	88.0	1.00 % by Weight		87.7			0.341	20	
Duplicate (3031015-DUP2)	Sou	rce: P3C0737-03	Prepare	d: 03/31/03	Analyz	ed: 04/01/	03		
May 0-114-	90.2	1.00 % by Weight		90.2			0.00	20	
Duplicate (3031015-DUP3)	' Sou	rce: P3C0899-01	Prepare	d: 03/31/03	Analyz	ed: 04/01/	03		
Duplicate (3031015-DUP3) % Solids	83.7	1.00 % by Weight		83.3			0.479	20	

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Philip Merenberg

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20332 Empire Avenue, Sulte F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382.7588

GeoDesign 14945 SW Sequoia Parkway, Suite 170

Project: MarineFin-1-01

907.334.9200 fax 907.334.9210

Project Number: na

Portland, OR 97224

Project Manager: Paul Trone

Reported: 04/18/03 12:13

Notes and Definitions

Sample extract was cleaned-up to remove suspect biogenic interference. D-13

The spike recovery for this QC sample is outside of established control limits due to sample matrix interference. Q-02

The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of Q-03 analyte already present in the sample.

The Spike Recovery and/or RPD is outside of control limits due to a non-homogeneous sample matrix. Q-14

The reporting limit for this analyte was raised due to matrix interference. R-03

Reporting limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte, R-05 and/or matrix interference.

Surrogate recovery is outside control limits due to matrix interference. S-09

DET Analyte DETECTED

Analyte NOT DETECTED at or above the reporting limit ND

NR Not Reported

Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%. dry

Sample results reported on a wet weight basis (as received) wet

RPD Relative Percent Difference

North Creek Analytical - Portland

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Philip Nerenberg, Laboratory Manager

Philip Neverberg

North Creek Analytical, Inc. **Environmental Laboratory Network** Page 34 of 34



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20332 Empire Ave Suite F-1, Bend, OR 99701-5711
3209 Denali St, Anchorage, AK 99503-4030

425-420-9200 FAX 420-9210 509-924-9200 FAX 924-9290 503-906-9200 FAX 906-9210 541-383-9310 FAX 382-7588 907-334-9200 FAX 334-9210

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6 MW-2 (23-25)	3/4/03	XX	*									5	2_			
MW-3 (19-20)	3/21/03	X	X		7							S	/			}
MW-4 (18-19)	3/21/03	XX	X									S	/			
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11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-9508 11115 E Montgomery Suite B, Spokane, WA 99206-4776 9405 SW Nimbus Ave, Beaverton, OR 97008-7132 20332 Empire Ave Suite F-1, Bend, OR 99701-5711 3209 Denali St, Anchorage, AK 99503-4030

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COC REV 1/03 /															<i>U</i> (101	PAGE	UF

20 May, 2003 Paul Trone GeoDesign 14945 SW Sequoia Parkway, Suite 170 Portland, OR 97224 RE: MarineFin-1-01 Enclosed are the results of analyses for samples received by the laboratory on 05/09/03 11:32. If you have any questions concerning this report, please feel free to contact me. Sincerely, Philip Nerenberg Laboratory Manager Work Orders included in this report: P3E0282

ANALYTICAL REPORT FOR SAMPLES

			Date Sampled	Date Received
Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
	P3E0282-01	Soil	03/21/03 12:00	05/09/03 11:32
MW-1 (8-9)		g . ti	03/21/03 12:00	05/09/03 11:32
MW-4 (18-19)	P3E0282-02	Soil		
MW-6 (13-15)	P3E0282-03	Soil	03/21/03 12:00	05/09/03 11:32

North Creek Analytical - Portland
Philip Merenberg

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Page 1 of 4

TCLP Metals per EPA 1311/6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-1 (8-9) (P3E0282-01) Soil					Sampled: 03/21	/03 Rece	ived: 05/09/0	03	
Lead	" ND	0.100	mg/l	1	1311/6020A	05/09/03	05/14/03	3050434	
MW-4 (18-19) (P3E0282-02) Soil				· .	Sampled: 03/21	/03 Rece	ived: 05/09/	03	······
Lead	ND	0.100	mg/l	1	1311/6020A	05/09/03	05/14/03	3050434	
MW-6 (13-15) (P3E0282-03) Soil					Sampled: 03/21	1/03 Rece	ived: 05/09/	03	
Lead	ND	0.100	mg/l	i	1311/6020A	05/09/03	05/14/03	3050434	

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Philip Nerenberg, Laboratory Manager

Page 2 of 4

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	Nor	th Creek	Analy	ical - P	ortland					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3050434 - EPA 1311/3005										
Blank (3050434-BLK1)	•			Prepare	d: 05/09/0	3 Analyz	ed: 05/14/	03		
Lead	ND	0.100	mg/l							
LCS (3050434-BS1)				Prepare	d: 05/09/0	3 Analyz	ed: 05/14/	03		
Lead	4.77	0.100	mg/l	5.00		95.4	75-125			
Matrix Spike (3050434-MS1)	Son	urce: P3E028	32-01	Prepare	d: 05/09/0	3 Analyz	ed: 05/14/	03		
Lead	4.85	. 0.100	mg/l	5.00	0.0154	96.7	50-150			

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Philip Neromberg

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Philip Nerenberg, Laboratory Manager

Page 3 of 4

Notes and Definitions

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.

wet Sample results reported on a wet weight basis (as received)

RPD Relative Percent Difference

North Creek Analytical - Portland

Philip Nevemberg

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Philip Nerenberg, Laboratory Manager

Page 4 of 4

30 April, 2003 Paul Trone GeoDesign 14945 SW Sequoia Parkway, Suite 170 Portland, OR 97224 RE: MarineFin-1-01 Enclosed are the results of analyses for samples received by the laboratory on 04/16/03 09:30. If you have any questions concerning this report, please feel free to contact me. Sincerely, Philip Nerenberg Laboratory Manager Work Orders included in this report: P3D0519

I	GeoDesign	Project: M	farineFin-1-01	
- 1	14945 SW Sequoia Parkway,Suite 170	Project Number: na	a	Reported:
-1	Portland, OR 97224	Project Manager: Pr	aul Trone	04/30/03 16:16

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	P3D0519-01	Water	04/15/03 11:45	04/16/03 09:30
MW-2	P3D0519-02	Water	04/15/03 12:47	04/16/03 09:30
MW-3	P3D0519-03	Water	04/15/03 13:25	04/16/03 09:30
MW-4	P3D0519-04	Water	04/15/03 14:04	04/16/03 09:30
MW-5	P3D0519-05	Water	04/15/03 14:54	04/16/03 09:30
MW-6	P3D0519-06	Water	04/15/03 15:30	04/16/03 09:30

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Philip Nerenberg, Laboratory Manager

GeoDesign Project: MarineFin-1-01 Reported: 14945 SW Sequoia Parkway,Suite 170 Project Number: na Reported: 04/30/03 16:16

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Note
				S	Sampled: 04/15	5/03 Recei	ved: 04/16/0	3	····
MW-1 (P3D0519-01) Water	ND	0.00100	mg/l	l	EPA 6020	04/21/03	04/22/03	3040749	
Antimony	ND	0.00100	11			n	04/28/03	"	
Arsenic	ND	0.00100	н	*	н	#	04/22/03	11	
Beryllium	=	0.00100		,,	11	n	н	t†	
Cadmium	ND	0.00100	#	"	н	N	Ħ	я	
Chromium	ND	0.00100	n	19	ri	**	н	et .	
Copper	ND	0.00200	*	n	18	,,	04/25/03	11	
Lead	ND		**	"	EPA 7470A	04/21/03	04/21/03	3040726	
Mercury	ND	0.000200		#1	EPA 6020	04/21/03	04/22/03	3040749	
Nickel	ND	0.00200		19	H 0020	#	11	TT.	
Selenium	ND	0.00100	.,			,	n	91	
Silver	ND	0.00100	,,		**	н .	04/25/03	•	
Thallium	ND	0.00100	17	 #		**	04/22/03	*	
Zinc	ND	0.00500	,,	,			0-1/22102		
MW-2 (P3D0519-02) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
	ND	0.00100	mg/l-	1	EPA 6020	04/21/03	04/22/03	3040749	
Antimony	0.00139	0.00100	n	**	n	Ħ	04/28/03	ů	
Arsenic	ND	0.00100	Ħ	11	п	n	04/22/03	**	
Beryllium	ND	0.00100	н	*	π .		н	"	
Cadmium	ND	0.00100	, н	*	11		Tr.	*	
Chromium	ND	0.00200	16	11	rt	D	11	#	
Copper	ND	0.00100		**	н		04/28/03	11	
Lead	ND	0.000200			EPA 7470A	04/21/03	04/21/03	3040726	
Mercury	ND	0.00200	n	n	EPA 6020	04/21/03	04/22/03	3040749	
Nickel	ND	0.00200		tt	#	n	Ħ	**	
Selenium	0.00138	0.00100	•	H	19	17	п	н	
Silver	0.00138 ND	0.00100	n	и	H		04/25/03	*	
Thallium Zinc	ND	0.00500	и	n	н		04/22/03	H	

North Creek Analytical - Portland

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Philip Nerenberg, Laboratory Manager

Philip Neverberg

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Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-3 (P3D0519-03) Water					Sampled: 04/1:	5/03 Rece	ived: 04/16/		
Antimony	ND	0.00100	mg/l	1	EPA 6020	04/21/03	04/22/03	3040749	
Arsenic	0.00120	0.00100	11	11	ıt	•	04/28/03	11	
Beryllium	ND	0.00100	н	11	n	"	04/22/03	н	
Cadmium	ND	0.00100	IŤ	п	Ħ	n	Ħ	11	
Chromium	0.00183	0.00100	Ħ	*	•	H	Ħ	11	
	0.00218	0.00200		71	Ħ	H		11	
Copper Lead	0.00117	0.00100		н	n	r	04/28/03	11	
Mercury	ND	0.000200	11	n	EPA 7470A	04/21/03	04/21/03	3040726	
Vickel	0.00413	0.00200	n	11	EPA 6020	04/21/03	04/22/03	3040749	
Selenium	ND	0.00100	77	n	n	"	Ħ	#	
Silver	ND	0.00100	n	n		**	Ħ	н	
Silver Thallium	ND	0.00100	11	ŧ	N	"	04/25/03	н	
Zine	0.00774	0.00500	H	n	н	n	04/22/03	Ħ	
MW-4 (P3D0519-04) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Antimony	0.00101	0.00100	mg/l	1	EPA 6020	04/21/03	04/22/03	3040749	
Anumony Arsenic	0.0195	0.00100	11	#	#	v	04/28/03	Ħ	
Beryllium	0.00357	0.00100			•	n	04/22/03	*	
Cadmium	0.00202	0.00100			H	H	п	4	
Chromium Chromium	0.182	0.00100	0	n	•	••	•	*	
	0.435	0.00200	10	#	π.		Ħ	#	
Copper Lead	0.692	0.00100	11		**	**	04/28/03	a	
Mercury	0.000973	0.000200		n	EPA 7470A	04/21/03	04/21/03	,3040726	
viercury Nickel	0.139	0.00200	*	D	EPA 6020	04/21/03	04/22/03	3040749	
	0.00103	0.00100	*	11	н	It	04/28/03	n	
Selenium	0.0149	0.00100	Ħ	**	н	н	04/22/03		
Silver	0.0149 ND	0.00100	*	n	п	11	04/25/03	**	
Thallium Zinc	0.635	0.00500	11	п	n	n	04/22/03	•	

North Creek Analytical - Portland

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Philip Nerenberg, Laboratory Manager

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Total Metals per EPA 6000/7000 Series Methods North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-5 (P3D0519-05) Water					Sampled: 04/1:	5/03 Recei	ved: 04/16/	03	
Antimony	ND	0.00100	mg/l	1	EPA 6020	04/21/03	04/22/03	3040749	
Arsenic	0.00286	0.00100	19	11		11	04/28/03	11	
Beryllium	ND	0.00100	*	W	н	n	04/22/03	I#	
Cadmium	ND	0.00100	17	14		19	**	19	
Chromium	ND	0.00100	n	**	Ħ	n	п	н	
Copper	ND	0.00200	9	n		Ħ	11	H	
Lead	ND	0.00100	*	79	"	н	04/28/03		
Mercury	ND	0.000200	n	**	BPA 7470A	04/21/03	04/21/03	3040726	
Nickel	ND	0.00200	R	11	EPA 6020	04/21/03	04/22/03	3040749	
Selenium	0.00119	0.00100	11	16	Ħ	Ħ	*	н	
Silver	ND	0.00100		u	н	**	Ħ	**	
Thallium	ND	0.00100	T T	•	Ħ	н	04/25/03	10	
Zinc	ND	0.00500		*	*	"	04/22/03	H	
MW-6 (P3D0519-06) Water				!	Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Antimony	ND	0.00100	mg/l	1	EPA 6020	04/21/03	04/22/03	3040749	
Arsenic	ND	0.00100	n	"	н	"	04/28/03	"	
Beryllium	ND	0.00100		If	Ħ	**	04/22/03	11	
Cadmium	ND	0.00100	*	Ħ	10	n	ŧ	**	
Chromium	ND	0.00100	H	и	•	**	п	н	
Copper	0.00227	0.00200		•	и .	17	\$1	**	
Lead	0.00173	0.00100		Ħ	"	11	04/28/03	11	
Mercury	ND	0.000200	н	**	EPA 7470A	04/21/03	04/21/03	3040726	
Nickel	0.00303	0.00200	Ħ	н	BPA 6020	04/21/93	04/22/03	3040749	
Selenium	ND	0.00100	*	н	7	Ħ	04/28/03	11	
Silver	ND	0.00100	Ħ	*	ti .	# .	04/22/03	11	
Thallium	ND	0.00100	n		u	11	04/25/03	Ħ	
Zinc	ND	0.00500	•	. #	Ħ		04/22/03	4	

North Creek Analytical - Portland

Philip Nevenberg

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Volatile Organic Compounds per EPA Method 8260B North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Note
MW-2 (P3D0519-02) Water				2	Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Acetone	ND	25.0	ug/l	I	EPA 8260B	04/17/03	04/17/03	3040612	
Benzene	ND	1.00	"	n	"	11	n	*	
Bromobenzene	ND	1.00	**	#	н	n	11	H	
Bromochloromethane	ND	1.00	"	*	"	. *	n	*	
Bromodichloromethane	ND	1.00	**	н	#	# ~	n	*	
Bromoform	ND	1.00	n	n ·	17	Ħ	11	1)	
Bromomethane	ND	5.00	н	11	**	п	14	Ħ	
2-Butanone	ND	10.0	11	n	*	u	۳	#1	
n-Butylbenzene	ND	5.00	11		**	17	**		
sec-Butylbenzene	ND	1.00	н	n	Ħ	н	11	II	
tert-Butylbenzene	ND	1.00	n	**		tt		Ħ	
Carbon disulfide	ND	10.0	11	*		н	11	u	
Carbon tetrachloride	ND	1.00	"	M	n	*	H	ņ	
Chlorobenzene	ND	1.00		*1	n	"	11	n	
Chloroethane	ND	1.00	*	**		Ħ	h	ţı	
Chloroform	ND	1.00	#	11	*	Ħ	**	•	
Chloromethane	ND	5.00	Ħ	н	17	*	n	Ħ	
2-Chlorotoluene	ND	1.00	*	и	**	**	11	1)	
4-Chlorotoluene	ND	1.00	*	*	Ħ	Ħ	10	Ħ	
1,2-Dibromo-3-chloropropane	ND	5.00	ũ	n	77	# .	H	11	
Dibromochloromethane	ND	1.00	rŧ .	n	#	, н	**	H	
1,2-Dibromoethane	ND	1.00	19		Ħ	Ħ	u u	W	
Dibromomethane	ND	1.00	Ħ	п	n	17	10	11	
1,2-Dichlorobenzene	ND	1.00	11	11		H	n	Ħ	
1,3-Dichlorobenzene	ND	1.00	*	n	*	19	**	*	
1,4-Dichlorobenzene	ND	1.00	**	11	17	9	Ħ	H	
Dichlorodifluoromethane	ND	5.00	#	n	n	н	Ħ	#1	
1.1-Dichloroethane	ND	1.00	n	н	n	"	н.	Ħ	
1,2-Dichloroethane	ND	1.00	Ħ	Ħ	11	*	11	n	
1,1-Dichloroethene	ND	1.00	*	Ħ		**	19	n	
cis-1,2-Dichloroethene	ND	1.00		Ħ	u		11	*	
trans-1,2-Dichloroethene	ND	1.00		*	n	Ħ	н	m	
1,2-Dichloropropane	ND	1.00	**	*	*	tr.	n	*	
1,3-Dichloropropane	. ND	1.00	•	#	π	×	11	•	
2,2-Dichloropropane	ND	1.00	я	#	#	Ħ		11	
1,1-Dichloropropene	ND	1.00	*	и	Ħ	#	. 11	•	
cis-1,3-Dichloropropene	ND	1.00	. "	**	n		*	*	
trans-1,3-Dichloropropene	ND	1.00	Ħ	*	n	Ħ	n	. #	
Ethylbenzene	ND	1.00	H	,	n	n	n		

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Volatile Organic Compounds per EPA Method 8260B North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (P3D0519-02) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/		
Hexachlorobutadiene	. ND	2.00	ug/l	i	EPA 8260B	04/17/03	04/17/03	3040612	
2-Hexanone	ND	10.0	n	It	и .	Ħ	n	"	
Isopropylbenzene	ND	2.00	н	**	**	I+	Ħ	**	
p-Isopropyltoluene	ND	2.00	*	π	"	n	Ħ	17	
4-Methyl-2-pentanone	ND	5.00		11	**	**	11	Ħ	
Methyl tert-butyl ether	ND	1.00	#	11	H	şt.	н	17	
Methylene chloride	ND	5.00	Ħ	н	"	н	"	17	
Naphthalene	ND	2.00	14	•	n	"	н	11	
n-Propylbenzene	ND	1.00	#	*	11	11	н	10	
Styrene	ND	1.00	e	11	•	н	ĸ	н	
1,1,1,2-Tetrachloroethane	ND	1.00	#	*	и	"	. "		
1,1,2,2-Tetrachloroethane	ND	1.00	n	**	*	"	H	Ħ	
Tetrachloroethene	ND	1.00	**	н	n	n	10	"	
Toluene	ND	1.00		it.	H	11	*	11	
1,2,3-Trichlorobenzene	ND	1.00	#		#	H	H	н	
1,2,4-Trichlorobenzene	ND	1.00	я	n		n	11	et	
1,1,1-Trichloroethane	ND	1.00	*	#	н	н		19	
1,1,2-Trichloroethane	ND	1.00	н	*	н	а	•	11	
Trichloroethene	ND	1.00	11	π	n	**	v	11	
Trichlorofluoromethane	ND	1.00	Ħ	•	77	n	"	Ħ	
1,2,3-Trichloropropane	ND	1.00			*	n	•	ŧŧ	
1,2,4-Trimethylbenzene	ND	1.00	Ħ		**	н	11	71	
1.3.5-Trimethylbenzene	ND	1.00	*	π	7	· n	"	**	
Vinyl chloride	ND	1.00	n	u	. #	,,	II	n	
o-Xylene	ND	1.00		**	*	"	11	n	
m,p-Xylene	ND	2.00	n	*	*	**		Ħ	
	101 %	84.5-124			*****				
Surr: 4-BFB		84.3-124 77.9-123							
Surr: 1,2-DCA-d4	101 % 108 %	83.5-119							
Surr: Dibromofluoromethane	97.5 %	84.1-116							
Surr: Toluene-d8	9/.5%	84.1-110							

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Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Note
MW-6 (P3D0519-06) Water				S	Sampled: 04/1	5/03 Recei	ved: 04/16/	03	
Acetone	ND	25.0	ug/l	1	EPA 8260B	04/17/03	04/17/03	3040612	
Benzene	ND	1.00	n	11	н	11	11	II	
Bromobenzene	ND	1.00	H	"	Ħ	7	7	•	
Bromochloromethane	ND	1.00	H		п	n	N	H	
Bromodichloromethane	ND	1.00		Ħ	16	n	10	p	
Bromoform	ND	1.00		*	#	11	Ħ	n	
Bromomethane	ND	5.00	n		н	"	11	n	
2-Butanone	ND	10.0	"	11	#	H	II	ю	
n-Butylbenzene	ND	5.00	Ħ	*	н	H		н	
sec-Butylbenzene	ND	1.00	"		н	"	11	n	
tert-Butylbenzene	ND	1.00	"	19	0	н	Ħ	м	
Carbon disulfide	ND	10.0	н	•	11		н .	**	
Carbon tetrachloride	ND	1.00	a	*	*1	11	Ħ	"	
Chlorobenzene	ND	1.00	*	11	*	**	Ħ	н	
Chloroethane	ND	1.00	*	Ħ	**	n	11	n	
Chloroform	ND	1.00	*	n	н	18	**	M	
Chloromethane	ND	5.00	и	*	**	76	**	n	
2-Chlorotoluene	ND	1.00	*	n	ff	Ħ	*	W	
4-Chlorotoluene	ND	1.00	н	Ħ	n	**	**	11	
1,2-Dibromo-3-chloropropane	ND	5.00	н	*	H	**	H	**	
Dibromochloromethane	ND	1.00	Ħ	Ħ	u	. #	"	17	
1,2-Dibromoethane	ND	1.00	"	'n	•	Ħ	*	**	
Dibromomethane	ND	1.00	11	H	11	11	16	н	
1,2-Dichlorobenzene	ND	1.00	19	Ħ	Ħ	Ħ	п	tt	
1,3-Dichlorobenzene	ND	1.00	n	н	π	11	Ħ	n	
1,4-Dichlorobenzene	ND	1.00	Ħ	II.	u	11	11	#	
Dichlorodifluoromethane	ND	5.00	17	н	ж	Ħ	11	11	
1,1-Dichloroethane	ND	1.00	#	n	H	n	u	"	
1,2-Dichloroethane	ND	1.00	n	11	11	п	н	17	
1,1-Dichloroethene	ND	1.00	, и	11	•	. "	н	11	
cis-1,2-Dichloroethene	ND	1.00	"	Ħ	n	17	*	n	
trans-1,2-Dichloroethene	ND	1.00	Ħ		п	a	11	• "	
1,2-Dichloropropane	ND	1.00	n	•	*		H	Ħ	
1,3-Dichloropropane	, ND	1.00	n	*	•	n	11	"	
2,2-Dichloropropane	ND	1.00	11	н	¥	"	11		
1,1-Dichloropropene	ND	1.00	п	H	11	. "	*		
cis-1,3-Dichloropropene	ND	1.00	. *	*	11	n	17		
trans-1,3-Dichloropropene	ND	1.00	*	*	n	**	"	. #	
Ethylbenzene	ND	1.00	*	Ħ	•	н	Ħ	. *	

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Volatile Organic Compounds per EPA Method 8260B North Creek Analytical - Portland

MW-6 (P3D0519-06) Water Hexachlorobutadiene 2-Hexanone Isopropylbenzene	Result ND ND	2.00	Units		Sampled: 04/1	5/02 P			
Hexachlorobutadiene 2-Hexanone Isopropylbenzene	ND	2.00		2				Λ 7	
2-Hexanone Isopropylbenzene	ND	2.00					ved: 04/16/		
Isopropylbenzene			ug/l	1	EPA 8260B	04/17/03	04/17/03	3040612	
		10.0	Ħ		•	17		*	
	ND	2.00	,	*1	11	"	11	'n	
p-Isopropyltoluene	ND	2.00	10	**	19	"	"	11	
4-Methyl-2-pentanone	ND	5.00	11	Ħ	11	11	n	0	
Methyl tert-butyl ether	ND	1.00	n	*1	17	*	и	Iŧ	
Methylene chloride	ND	5.00	, п	H	"	71	H	'n	
Naphthalene	ND	2.00	11	H	"	. "	#	II	
n-Propylbenzene	ND	1.00	19	**	tı	**	11	n	
Styrene	ND	1.00	H	n	n	,**	11	ч	
1,1,1,2-Tetrachloroethane	ND	1.00	11	*1	11	**	it	н	
1,1,2,2-Tetrachioroethane	ND	1.00	H	11	17	*	11	H	
Tetrachloroethene	ND	1.00	11	11	n	"	tt	н	
Toluene	ND	1.00	H	**	17	*	11	H	
1,2,3-Trichlorobenzene	ND	1.00	,	*	н	11	n	11	
1,2,4-Trichlorobenzene	ND	1.00	#	11		11	ri		
1,1,1-Trichloroethane	ND	1.00	12	ut .		H	Ħ	H	
1,1,2-Trichloroethane	ND	1.00	n	n	Ħ	"	Ħ	· H	
Trichloroethene	ND	1.00	17	**	11	H	71	и	
Trichlorofluoromethane	ND	1.00		n	u u	"	#1	11	
1,2,3-Trichloropropane	ND	1.00	**	H	п	н	11	n	
1,2,4-Trimethylbenzene	ND	1.00	н	н	11	11	Ħ	н	
1,3,5-Trimethylbenzene	ND	1.00	"	**	ŧ	"	**	11	
Vinyl chloride	ND	1.00	**	u		11	n		
o-Xylene	ND	1.00	17	**	Ħ	**	11	11	
m,p-Xylene	ND	2.00	11	n	**	11	11	n	
Surr: 4-BFB	102 %	84.5-124						•	
Surr: 1,2-DCA-d4	101 %	77.9-123				•			
Surr: Dibromofluoromethane	108 %	83.5-119							
Surr: Toluene-d8	99.5 %	84.1-116				•			

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Polynuclear Aromatic Compounds per EPA 8270M-SIM North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Anaiyzed	Batch	Notes
MW-1 (P3D0519-01) Water					Sampled: 04/1:	5/03 Rece	ived: 04/16/	03	
Acenaphthene	ND	0.100	ug/l	i	EPA 8270m	04/22/03	04/25/03	3040772	
Acenaphthylene	ND	0.100	*	n	*	IT	*	**	
Anthracene	ND	0.100	n	и	n	n	•	n	
Benzo (a) anthracene	ND	0.100	Ħ	n	Ħ	ħ	H	**	
Benzo (a) pyrene	ND	0.100	19	#	Ħ	91	**	. "	
Benzo (b) fluoranthene	ND	0.100	**	Ħ	•	н	H	"	
Benzo (ghi) perylene	ND	0.100	17	n	tr		"	10	
Benzo (k) fluoranthene	ND	0.100	**			*		67	
Chrysene	ND	0.100		u	Ħ	n	H	**	
Dibenzo (a,h) anthracene	ND	0.200	ie	ri	π		*	11	
Fluoranthene	ND	0.100	н	#1	11	"	n	Ħ	
Fluorene	ND	0.100	н	11	tt		11	11	
Indeno (1,2,3-cd) pyrene	ND	0.100	*	Ħ	'n	n	**	19	
Naphthalene	ND	0.100	**	n	"	11	n	•	
Phenanthrene	ND	0.100		Ħ	"	Ħ	n	**	
Pyrene	ND	0.100	#	н	н	#	11		
Surr: Fluorene-d10	84.9 %	25-125							
Surr: Pyrene-d10	97.5 %	23-150							
Surr: Benzo (a) pyrene-d12	87.0 %	10-125			•				
MW-2 (P3D0519-02) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Acenaphthene	ND	0.100	ug/l	1	EPA 8270m	04/22/03	04/26/03	3040772	
Acenaphthylene	ND	0.100	"	н	"	n	н	Ħ	
Anthracene	ND	0.100	11	#	n	"		n	
Benzo (a) anthracene	ND	0.100	17	n	11	*	•	11	
Benzo (a) pyrene	ND	0.100	Ħ	n	n	n	. "	т .	
Benzo (b) fluoranthene	ND	0.100	n	19	ij	n	11	**	
Benzo (ghi) perylene	ND .	0.100	н	n	Ħ	*	Ħ	п	
Benzo (k) fluoranthene	ND	0.100	n	n		. **	**	#	
Chrysene	ND	0.100		n	"	* '	К	Ħ	
Dibenzo (a,h) anthracene	ND	0.200	*	10	**	n	n	•	
Fluoranthene	ND	0.100		н	**	•	*	" .	
Fluorene	ND	0.100	н,	n	m	Ħ	H	n	
Indeno (1,2,3-cd) pyrene	ND	0.100	**	Ħ	n ,	11		n	
Naphthalene	. ND	0.100	н	*	. "	11	n	#	
Phenanthrene	ND	0.100	#	π	n	*	11	(1	
Pyrene	ND	0.100	. н	11	H	H	н	,	
Surr: Fluorene-d10	75.2 %	25-125	-						

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Polynuclear Aromatic Compounds per EPA 8270M-SIM

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Änalyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-2 (P3D0519-02) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Surr: Pyrene-d10	85.7 %	23-150							
Surr: Benzo (a) pyrene-d12	79.8 %	10-125							
Burr. Bonzo (a) pyrene az-									
MW-3 (P3D0519-03) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Acenaphthene	0.490	0.100	ug/l	1	EPA 8270m	04/22/03	04/26/03	3040772	
Acenaphihylene	ND	0.100	H		u	Ħ	Ħ	п	
Anthracene	ND	0.100	11	10	n	*	**	n	
Benzo (a) anthracene	ND	0.100	н	*	Ħ	n	Ħ	н	
Benzo (a) pyrene	ND	0.100	11	*	11	tı	n	10	
Benzo (b) fluoranthene	ND	0.100	#	•	14	**	**	H	
Benzo (ghi) perylene	ND	0.100		n	н	11	**	и	
Benzo (k) fluoranthene	ND	0.100	я		н	"	n	n	
Chrysene	ND	0.100	n	*	#	11	11	*	
Dibenzo (a,h) anthracene	ND	0.200	11	R			16	*	
Fluoranthene	0.795	0.100	17		11	н	11	n	
~ · · · · · · · · · · · · · · · · ·	ND	0.100	**	n	H	н	*	**	
Fluorene	ND	0.100		*	#	*	**	Ħ	
Indeno (1,2,3-cd) pyrene	ND	0.100	,	и	#	11		я ,	
Naphthalene	0.117	0.100	,,	*	•	н		#	
Phenanthrene	1.11	0.100	tt		11	н	11	n	
Pyrene				· · · · · ·					
Surr: Fluorene-d10	75.0 %	25-125							
Surr: Pyrene-d10	86.4 %	23-150							
Surr: Benzo (a) pyrene-d12	74.2 %	10-125							
MW-4 (P3D0519-04) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	′03	
Acenaphthene	0.808	0.100	ug/l	1	EPA 8270m	04/22/03	04/26/03	3040772	
Acenaphthylene	ND	0.100	, "	ti	r	n	11	\$ †	
Anthracene	ND	0.100	*	#		u	11	Ħ	
Benzo (a) anthracene	. ND	0.100	n	*	, *	, •	0		
Benzo (a) pyrene	ND	0.100	, и		17	H	n	**	
Benzo (b) fluoranthene	ND	0.100	#	*	*	*	н	Ħ	
Benzo (ghi) perylene	0.100	0.100	*	n	Ħ	*		п	
Benzo (k) fluoranthene	ND	0.100	п		11	11	19	n	
* *	0.113	0.100	и.	н		11	*	•	
Chrysene	· ND	0.200	н		•	**	*	11	
Dibenzo (a,h) anthracene	0.168	0.200		H	11	#		a	
Fluoranthene	0.108 ND	0.100		11	11	н	n		
Fluorene				*		11	н		
Indeno (1,2,3-cd) pyrene	ND	0.100	•	•	•				

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Polynuclear Aromatic Compounds per EPA 8270M-SIM North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-4 (P3D0519-04) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Naphthalene	0.135	0.100	ug/l	1	EPA 8270m	04/22/03	04/26/03	3040772	
Phenanthrene	0.134	0.100	n	41	н	•	Ħ	#	
Pyrene	0.649	0.100		*	n	li .	11		
Surr: Fluorene-d10	73.5 %	25-125							
Surr: Pyrene-d10	76.9 %	23-150							
Surr: Benzo (a) pyrene-d12	53.4 %	10-125							
MW-5 (P3D0519-05) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Acenaphthene	0.196	0.100	ug/l	1	EPA 8270m	04/22/03	04/26/03	3040772	'
Acenaphthylene	ND	0.100	n	11	II .	16	n	10	
Anthracene	ND	0.100	•	11	"	11-	H .		
Benzo (a) anthracene	ND	0.100	**	4	**	11	п	n	
Benzo (a) pyrene	ND	0.100	**	n	11	n	tr	**	
Benzo (b) fluoranthene	ND	0.100	n	n	11	H	"	"	
Benzo (ghi) perylene	ND	0.100	н	n	11	Ħ		n	
Benzo (k) fluoranthene	ND	0.100	**		n	#	*	41	
Chrysene	ND	0.100	-	77	u	*	**	U	
Dibenzo (a,h) anthracene	ND	0.200	н	**	•	H	n	н	
Fluoranthene	0.134	0.100	n	Ħ	n	Ħ	#	Ħ	
Fluorene	ND	0.100	n	n	10,	**	μ	n	
Indeno (1,2,3-cd) pyrene	ND	0.100				n	7	n	
Naphthalene	ND	0.100		n			¥	*	
Phenanthrene	0.277	0.100	H	н	n	11	11	#	
Pyrene	0.666	0.100		л	н	n	п		
Surr: Fluorene-d10	73.9 %	25-125							
Surr: Pyrene-d10	86.6 %	23-150							
Surr: Benzo (a) pyrene-d12	76.1 %	10-125							

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Polynuclear Aromatic Compounds per EPA 8270M-SIM

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Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Note
MW-6 (P3D0519-06) Water					Sampled: 04/1	5/03 Rece	ived: 04/16/	03	
Acenaphthene	ND	0.100	ug/l	1	EPA 8270m	04/22/03	04/28/03	3040772	
Acenaphthylene	ND	0.100	-	11	**	"	11	н	
Anthracene	ND	0.100		u	н	n	11	19	
Benzo (a) anthracene	ND	0.100		H	11	"	18	п	
Benzo (a) pyrene	ND	0.100	*	*		u	Ħ	н	
Benzo (b) fluoranthene	ND	0.100	*	*	n	**		TP	
Benzo (ghi) perylene	ND	0.100		n	11	n	Ħ	*	
Benzo (k) fluoranthene	ND	0.100	ø	н	**	**	II .	r	
Chrysene	ND	0.100		11		11	n	H	
Dibenzo (a,h) anthracene	ND	0.200	w	11	я	Ħ	11	н	
Fluoranthene	ND	0,100	Ħ	n	•	Ħ	#	17	
Fluorene	ND	0.100	11	н	11	Ħ		н	•
Indeno (1,2,3-cd) pyrene	ND	0.100	Ħ	n	n	11	n	π	
Naphthalene	ND	0.100	n	11	n	н	It	. #	
Phenanthrene	ND	0.100	· *	R	n	Ħ	Ħ	IP .	
Pyrene	ND	0.100		"	н .	#	n	11	
Surr: Fluorene-d10	72.9 %	25-125							
Surr: Pyrene-d10	84.3 %	23-150							
Surr: Benzo (a) pyrene-d12	76.3 %	10-125							

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TURN	Malanain		1000/10	age ideal	fort le	Wallian C	Material (
	Nor	th Creek	Analy	tical - Po	rtland					
		Reporting	** *.	Spike	Source	%REC	%REC Limits	RPD	RPD Limit	Notes
Analyte	Result	Limit	Units	Lovel	Result	%REC	Limits	RPD	Limit	Notes
Batch 3040726 - EPA 7470					·					
Blank (3040726-BLK1)				Prepare	d & Analy	zed: 04/2	1/03			
Mercury	ND	0.000200	mg/l	•						
LCS (3040726-BS1)				Ргераге	d & Analy					
Mercury	0.00492	0.000200	mg/l	0.00500		98.4	80-120			
Duplicate (3040726-DUP1)	Sou	ırce: P3D051	19-01	Prepare	d & Analy	zed: 04/2	1/03			
Mercury	ND	0.000200	mg/l		ND				20	
Matrix Spike (3040726-MS1)	Son	arce: P3D051	19-01	Prepare	d & Analy	zed: 04/2	1/03			
Mercury	0.00486	0.000200	mg/l	0.00500	ND	97.2	75-125			
Batch 3040749 - EPA 200/3005										
Blank (3040749-BLK1)				Prepare	d: 04/21/0	3 Analyz	ed: 04/22/0	03		
Antimony	ND	0.00100	mg/l							
Arsenic	ND	0.00100	н							
Beryllium	ND	0.00100	Ħ							
Cadmium	ND	0.00100	n				*			
Chromium	ND	0.00100	н							
Copper	ND	0.00200								
Lead	ND	0.00100	,,							
Nickel	ND	0.00200	*							
Selenium	ND	0.00100	**							
Silver	ND	0.00100	*							
Thallium	ND	0.00100								
Zinc	ND	0.00500	н				•			

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The state of the s	Nor	th Creek	Analyt	ical - Po	rtland					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040749 - EPA 200/3005										
LCS (3040749-BS1)				Prepared	1: 04/21/0	3 Analyz	ed: 04/22/0	03		
Antimony	0.0470	0.00100	mg/l	0.0500		94.0	80-120			
Arsenic	0.0973	0.00100	u	0.100		97.3	80-120			
Beryllium	0.0950	0.00100	•	0.100		95.0	80-120			
Cadmium	0.0952	0.00100	**	0.100		95.2	80-120			
Chromium	0.108	0.00100	17	0.100		108	80-120			
Copper	0.103	0.00200	н	0.100		103	80-120			
Lead	0.0990	0.00100	п	0.100		99.0	80-120			
Nickel	0.113	0.00200	31	0.100		113	80-120			
Selenium	0.0991	0.00100	*	0.100		99.1	80-120			
Silver	0.0517	0.00100	Ħ	0.0500		103	80-120			
Thallium	0.0502	0.00100	**	0.0500		100	80-120			
Zinc	0.100	0.00500	11	0.100		100	80-120			
Duplicate (3040749-DUP1)	So	urce: P3D05	19-01	Prepare	d: 04/21/0	3 Analyz	ed: 04/22/	03		
Antimony	ND	0.00100	mg/l		ND				20	
Arsenic	ND	0.00100			ND				20	
Beryllium	ND	0.00100	4		ND				20	
Cadmium	ND	0.00100	n		ND				20	
Chromium	ND	0.00100	11		ND				20	
Copper	ND	0.00200	**		0.000710			8.11	20	
Lead	ND	0.00100	W		0.000550			31.6	20	Q-06
Nickel	ND	0.00200	*		ND				20	
Sclenium	ND	0.00100	**		ND				20	
Silver	ND	0.00100	n		0.0000600				20	
Thallium	ND	0.00100			ND				20	
Zinc	ND	0.00500	•		ND				20	
Matrix Spike (3040749-MS1)	So	urce: P3D05	19-01	Prepare	d: 04/21/0	3 Analyz	ed: 04/22/	03		
Antimony	0.0471	0.00100	mg/l	0.0500	ND	94.2	75-125			
Arsenic	0.0981	0.00100	#	0.100	ND	98.1	75-125			
Beryllium	0.105	0.00100	n	0.100	ND	105	75-125			
Cadmium	0.0967	0.00100	11	0.100	ND	96.7	75-125			
Chromium	0.104	0.00100	Ħ	0.100	ND	104	75-125			
Copper	0.106	0.00200	"	0.100	0.000710	105	75-125			
Lead	0.100	0.00100	. •	0.100	0.000550	99.4	75-125			•
Nickel	0.103	0.00200	n	0.100	ND	103	75-125		-	
Selenium	0.0954	0.00100	11	0.100	ND	95.4	75-125			

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MATERIAL STATE AND A STATE OF THE ANALYSIS AND A STATE OF THE STATE OF	Nor	th Creek	Analyt	ical - P	ortland					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040749 - EPA 200/3005			· · · · · · · · · · · · · · · · · · ·							
Matrix Spike (3040749-MS1)	Sou	rce: P3D051	19-01	Prepare	d: 04/21/03	Analyz)3		
Silver	0.0493	0.00100	mg/l	0.0500	0.0000600	98.5	75-125			
Thallium	0.0577	0.00100	" -	0.0500	ND	115	75-125			
Zinc	0.0997	0.00500	19	0.100	ND	99.7	75-125			
Matrix Spike (3040749-MS2)	Sou	ırce: P3D05	19-02	Prepare	ed: 04/21/03	Analyz	ed: 04/22/0)3		
Antimony	0.0469	0.00100	mg/l	0.0500	ND	93.8	75-125			
Arsenic	0.102	0.00100	п	0.100	0.00139	101	75-125			
Beryllium	0.105	0.00100	H	0.100	0.000140	105	75-125			
Cadmium	0.0983	0.00100	1f	0.100	ND	98.3	75-125			
Chromium	0.104	0.00100	19	0.100	0.000810	103	75-125			
Copper	0.104	0.00200	n	0.100	0.000840	103	75-125			
Lead	0.100	0.00100	Ħ	0.100	0.000400	99.6	75-125			
Nickel	0.104	0.00200	Ħ	0.100	ND	104	75-125			
Selenium	0.0935	0,00100	*	0.100	ND	93.5	75-125			
Silver	0.0517	0.00100	17	0.0500	0.00138	101	75-125			
Thallium	0.0560	0.00100	Ħ	0.0500	0.000180	112	75-125			
Zinc	0.0991	0.00500	Ħ	0.100	0.00146	97.6	75-125			

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		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 3040612 - EPA 5030B										
Blank (3040612-BLK1)				Prepare	d & Analy	zed: 04/17	7/03			
Acetone	ND	25.0	ug/l							
Benzene	ND	1.00	ıı							
Bromobenzene	, ND	1.00	*							
Bromochloromethane	ND	1.00	*							
Bromodichloromethane	ND	1.00	n							
Bromoform	ND	1.00	W							
3romomethane	, ND	5.00	Ħ							
2-Butanone	ND	10.0	19							
a-Butylbenzene	ND	5.00	#							
ec-Butylbenzene	ND.	1.00	н							
ert-Butylbenzene	ND	1.00	#							
Carbon disulfide	ND	10.0	**							
Carbon tetrachloride	ND	1.00	T							
Chlorobenzene	ND	1.00	*							
Chloroethane	ND	1.00	#							
Chloroform	ND	1.00	**							
Chloromethane	ND	5.00								
-Chlorotoluene	ND	· 1.00	#							
-Chlorotoluene	ND	1.00	н							
,2-Dibromo-3-chloropropane	ND	5.00	Ħ							
Dibromochloromethane	ND .	1.00	"							
,2-Dibromoethane	ND	1.00	m							
Dibromomethane	ND	1.00	m							
,2-Dichlorobenzene	ND	1.00	•							
,3-Dichlorobenzene	ND	1.00	*							
,4-Dichlorobenzene	ND	1.00	H							
Dichlorodifluoromethane	ND	5.00	Ħ							
,I-Dichloroethane	ND	1.00	H			•				
,2-Dichloroethane	ND	1.00	п							
,l-Dichloroethene	ND	1.00								
is-1,2-Dichloroethene	ND	1.00	n	,						
ans-1,2-Dichloroethene	ND	1.00	11*							
,2-Dichloropropane	ND	1.00	**							
,3-Dichloropropane	ND	. 1.00	. 11							
,2-Dichloropropane	ND	1.00	п							
,l-Dichloropropene	ND	1.00	19						•	

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		th Creek		Spike	Source		%REC		RPD -	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 3040612 - EPA 5030B										
Blank (3040612-BLK1)				Prepare	d & Analy	zed: 04/1	7/03			
eis-1,3-Dichloropropene	ND	1.00	ug/l							
rans-1,3-Dichloropropene	ND	1.00	н							
Ethylbenzene	ND	1.00	99							
Hexachlorobutadiene	ND	2.00	**							
2-Hexanone	ND	10.0	п							
Isopropylbenzene	ND	2.00	n							
p-Isopropyltoluene	ND	2.00	11							
4-Methyl-2-pentanone	ND	5.00	*							
Methyl tert-butyl ether	ND	1.00	n							
Methylene chloride	ND	5.00	**					•		
Naphthalene	ND	2.00	n							
n-Propylbenzene	ND	1.00	M							
Styrene	ND	1.00	n							
1,1,1,2-Tetrachloroethane	ND	1.00	•					•		
1,1,2,2-Tetrachloroethane	ND	1.00	n ·							
Tetrachloroethene	ND	1.00	**							
Toluene	ND	1.00	н			4				
1,2,3-Trichlorobenzene	ND	1.00	"							
1,2,4-Trichlorobenzene	ND	1.00	11							
1,1,1-Trichloroethane	ND	1.00	0.							
1,1,2-Trichloroethane	ND	1.00	н							
Trichloroethene	ND	1.00	10							
Trichlorofluoromethane	ND	1.00	11							
1,2,3-Trichloropropane	ND	1.00	**							
1,2,4-Trimethylbenzene	ND	1.00	**							
1,3,5-Trimethylbenzene	ND	1.00	n							
Vinyl chloride	ND	1.00	**							
o-Xylene	ND	1.00	n							
m,p-Xylene	ND	2.00								
Surr: 4-BFB	20.4		n	20.0		102	84.5-124			
Surr: 1,2-DCA-d4	20.8		"	20.0		104	77.9-123			
Surr: Dibromofluoromethane	20.4		•	20.0		102	83.5-119			
Surr: Toluene-d8	19.3		,	20.0		96.5	84.1-116			

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	Noi	rth Creek	Analyt	ical - Po	ortland					
		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 3040612 - EPA 5030B									 	
LCS (3040612-BS1)				Prepare	d & Analy					
Benzene	20.1	1.00	ug/l	20.0		100	80-120			
Chlorobenzene	20.4	1.00	11	20.0		102	80-120		•	
1,1-Dichloroethene	20.5	1.00	**	20.0		102	80-120			
Toluene	20.2	1.00	11	20.0		101	80-120			
Trichloroethene	20.6	1.00	11	20.0		103	80-124			
Surr: 4-BFB	20.6	, <u></u>	#	20.0		103	84.5-124			
Surr: 1,2-DCA-d4	20.9		. #	20. 0		104	77.9-123			
Surr: Dibromofluoromethane	21.1		ù	20.0		106	83.5-119			
Surr: Toluene-d8	20.7		"	20.0		104	84.1-116			
Matrix Spike (3040612-MS1)	So	urce: P3D05	06-01	Prepare	d & Analy	zed: 04/1	7/03			
Benzene	20.7	1.00	ug/l	20.0	ND	104	80-124			
Chlorobenzene	20.5	1.00	#	20.0	ND	102	72.9-134			
1,1-Dichloroethene	22.0	1.00	*	20.0	ND	110	79.3-127			
Toluene	20.7	1.00	*	20.0	0.410	101	79.7-131			
Trichloroethene	19.8	1.00	Ħ	20.0	ND	99.0	68.4-130			
Surr: 4-BFB	20.2		"	20.0		101	84.5-124			
Surr: 1,2-DCA-d4	21.0		,	20.0		105	77.9 -123			
Surr: Dibromofluoromethane	21.5		*	20.0		108	83.5-119			
Surr: Toluene-d8	20.4		•	20.0		102	84.1-116			
Matrix Spike Dup (3040612-MSD1)	So	urce: P3D05	06-01	Prepare	d & Analy	zed: 04/1	7/03			
Benzene	20.8	1.00	ug/l	20.0	ND	104	80-124	0.482	25	
Chlorobenzene	20.5	1.00		20.0	ND	102	72.9-134	0.00	25	
1,1-Dichloroethene	21.7	1.00	11	20.0	ND	108	79.3-127	1.37	25	
Toluene	20.8	1.00	н	20.0	0.410	102	79.7-131	0.482	25	
Trichleroethene	20.0	1.00	n	20.0	ND	100	68.4-130	1.01	25	
Surr: 4-BFB	20.1		7	20.0		100	84.5-124			
Surr: 1,2-DCA-d4	20.5		*	20.0		102	77.9-123			
Surr: Dibromofluoromethane	21.9		*	20.0		110	83.5-119			
Surr: Toluene-d8	20.7	•	.,	20.0		104	84.1-116			

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		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Resuit	%REC	Limits	RPD	Limit	Notes
Batch 3040772 - EPA 3520/600 Series						·			······	
Blank (3040772-BLK1)				Prepared: 04/22/03 Analyzed: 04/28/03						
Acenaphthene	ND	0.100	ug/i							
Acenaphthylene	ND	0.100	n							
Anthracene	ND	0.100	H.							
Benzo (a) anthracene	ND	0.100	18							
Benzo (a) pyrene	ND	0.100	#							
Benzo (b) fluoranthene	ND	0.100	n							
Benzo (ghi) perylene	ND	0.100	н							
Benzo (k) fluoranthene	ND	0.100	a a							
Chrysene	ND	0.100	н							
Dibenzo (a,h) anthracene	ND	0.200	11							
Fluoranthene	ND	0.100	Ħ							
Fluorene	ND	0.100	H							
ndeno (1,2,3-cd) pyrene	ND	0.100	Ħ							
Naphthalene	ND	0.100	11							
Phenanthrene	ND	0.100	11							
Pyrene	ND	0.100	11							
Surr: Fluorene-d10	2.18		n	2.50		87.2	25-125			
Surr: Pyrene-d10	2.26		n	2.50		90.4	23-150			
Surr: Benzo (a) pyrene-d12	2.24		n	2.50		89.6	10-125			
LCS (3040772-BS1)				Ргераге	d: 04/22/0	3 Analyze	d: 04/28/0	3		
Acenaphthene	1.80	0.100	ug/l	2.50		72.0	26-135			
Benzo (a) pyrene	1.81	0.100	п	2.50		. 72.4	38-137			
Pyrene	2.00	0,100	19	2.50		80.0	33-133			
Surr: Fluorene-d10	2.00		,	2.50		80.0	25-125			
Surr: Pyrene-d10	2.11		•	2.50		84.4	23-150			
Surr: Benzo (a) pyrene-d12	1.98		"	2.50		79.2	10-125			

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Analyte	No.	rth Creek Reporting Limit	Analyt Units	ical - Po Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040772 - EPA 3520/600 Series										
LCS Dup (3040772-BSD1)				Prepare	d: 04/22/0	3 Analyz	ed: 04/28/0	03		
Acenaphthene	1.69	0.100	ug/l	2.50		67.6	26-135	6.30	60	
Benzo (a) pyrene	1.75	0.100	,,	2.50		70.0	38-137	3.37	60	
Pyrene	1.77	0.100	Ħ	2.50		70.8	33-133	12.2	60	
Surr: Fluorene-d10	1.94		"	2.50		77.6	25-125			
Surr: Pruorene-u10 Surr: Pyrene-d10	1.95		#	2.50		78.0	23-150			
Surr: Pyrene-a10 Surr: Benzo (a) pyrene-d12	2.03		. "	2.50		81.2	10-125			

North Creek Analytical - Portland

Philip Nerenberg, Laboratory Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Page 20 of 21

	Project	MarineFin-1-01	•	l
GeoDesign	Project Number:		Reported:	
14945 SW Sequoia Parkway,Suite 170	Project Manager:	Davi Trone	04/30/03 16:16	ı
Portland, OR 97224	Project Manager.	ram fronc		i

Notes and Definitions

Q-06 Analyses are not controlled on RPD values from sample concentrations less than 5 times the reporting limit.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.

wet Sample results reported on a wet weight basis (as received)

RPD Relative Percent Difference

Not Reported

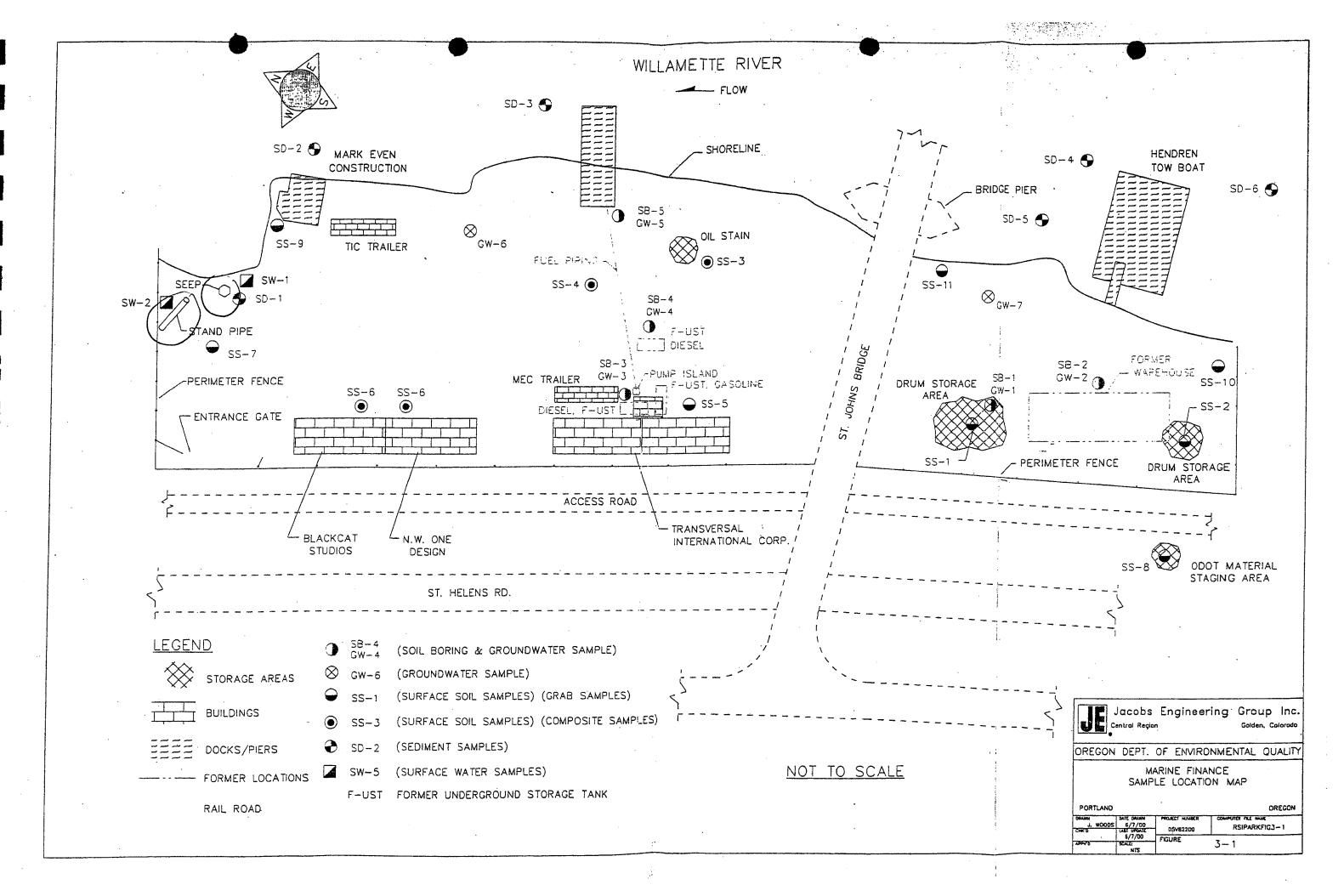
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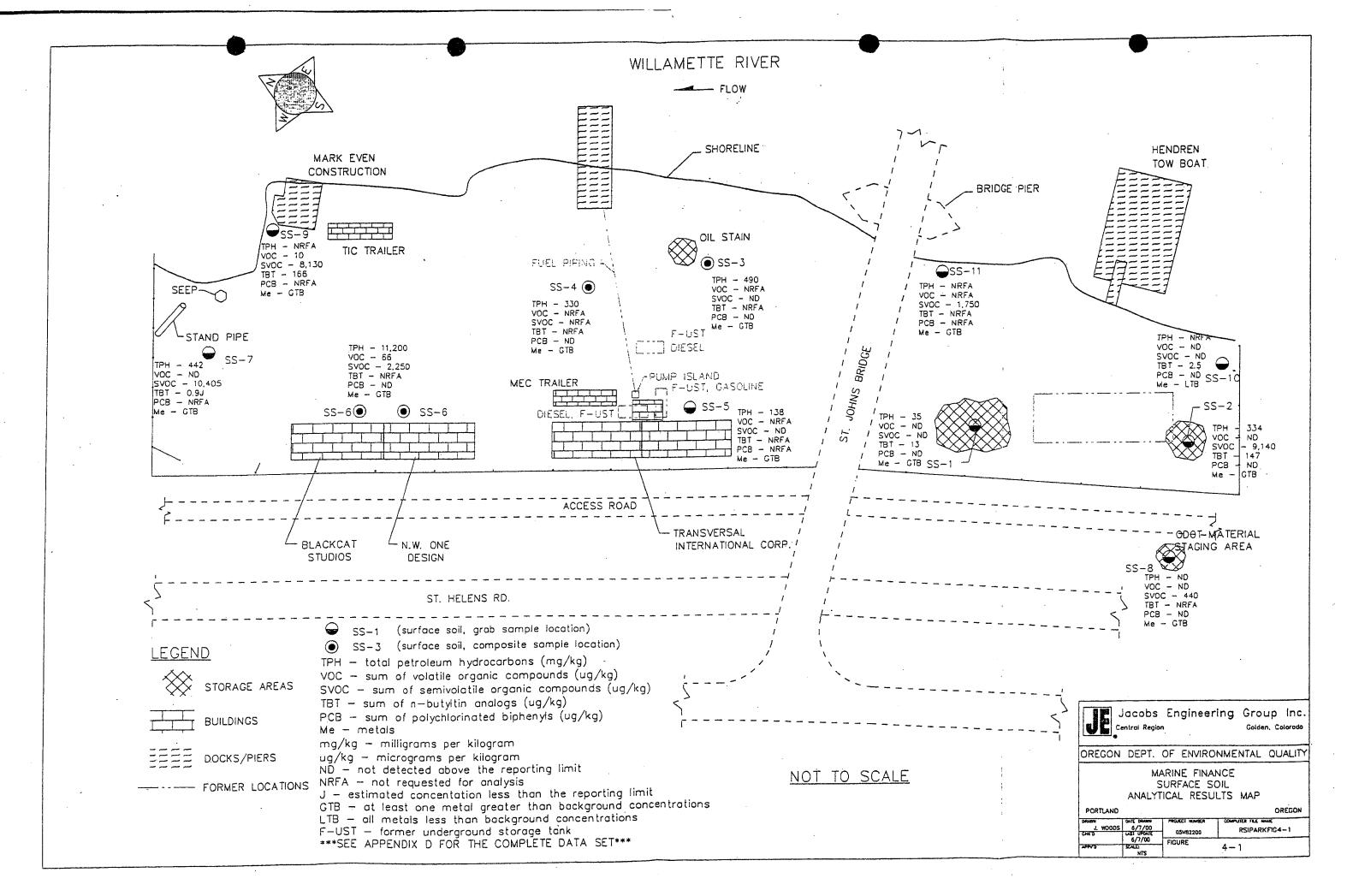
North Creek Analytical - Portland

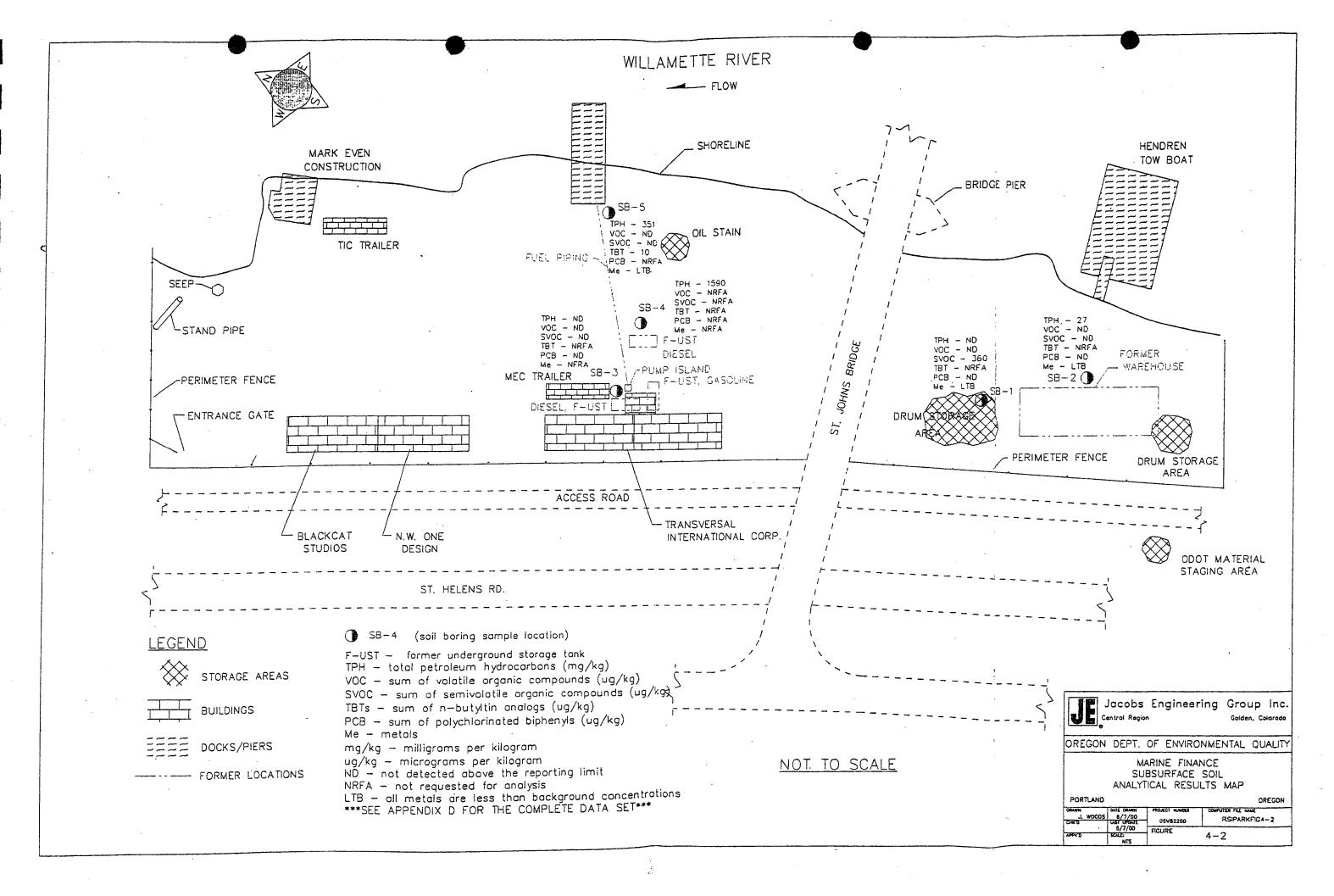
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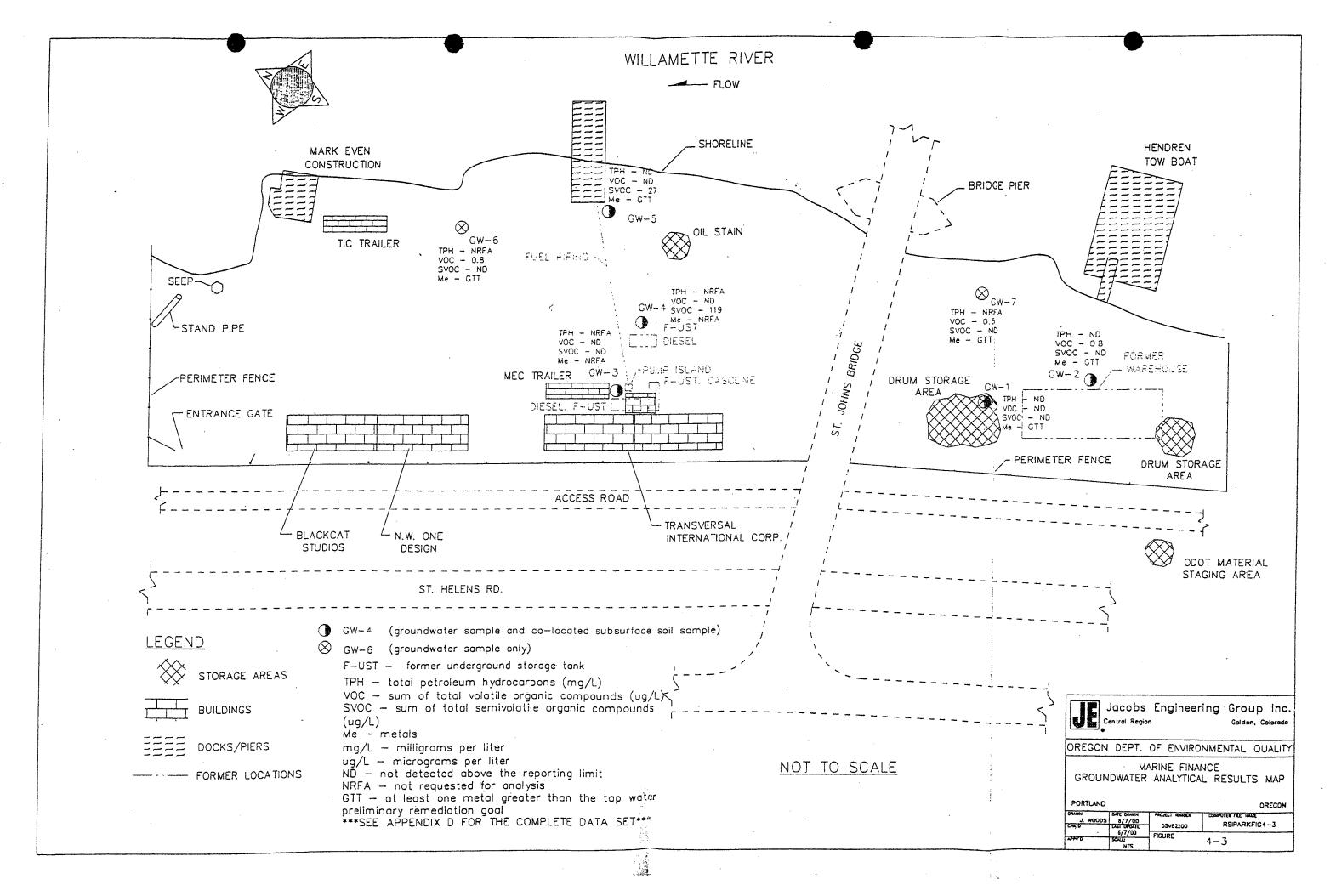
Philip Nerenberg, Laboratory Manager

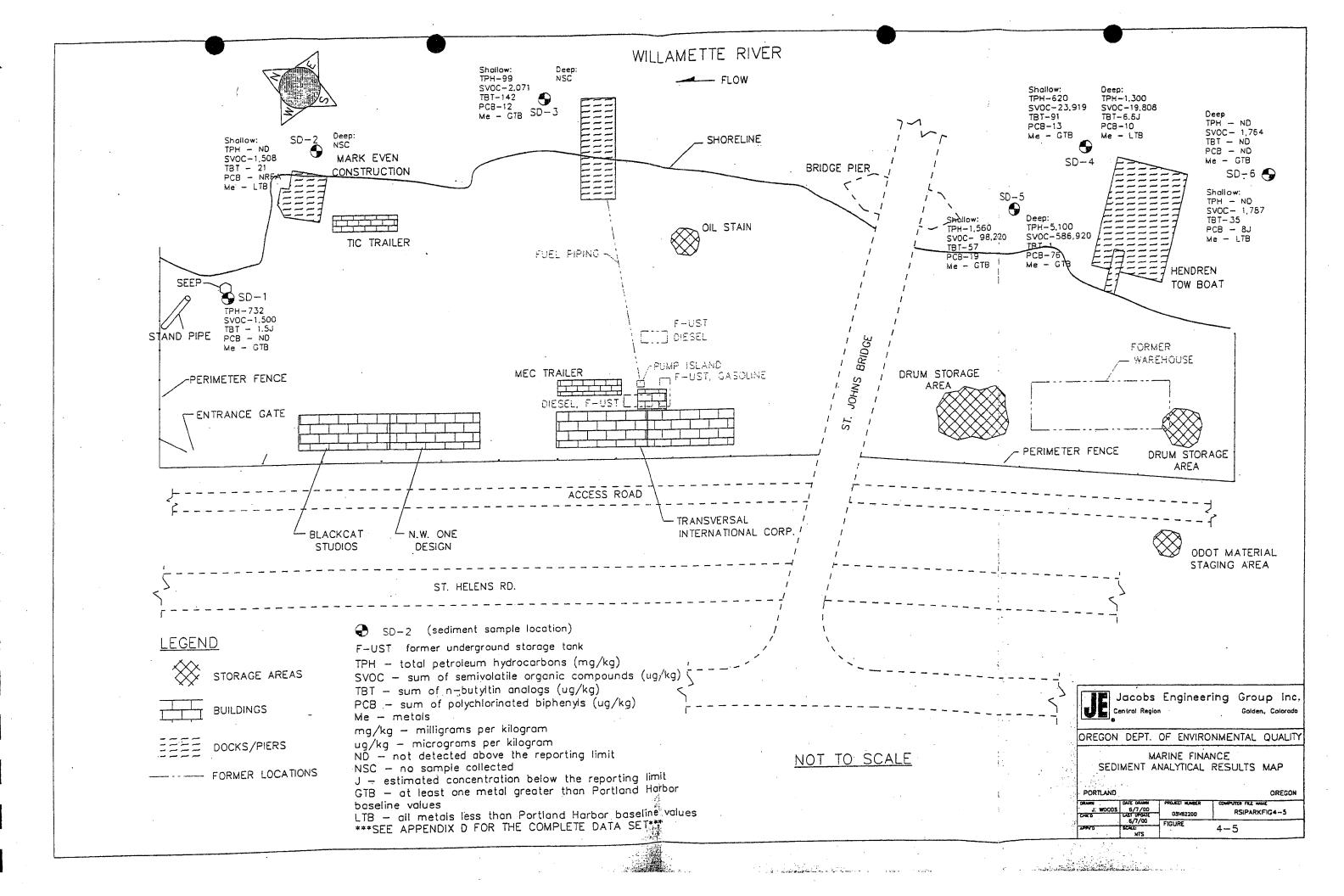
Page 21 of 21













Georechnical - Environmental - Geological

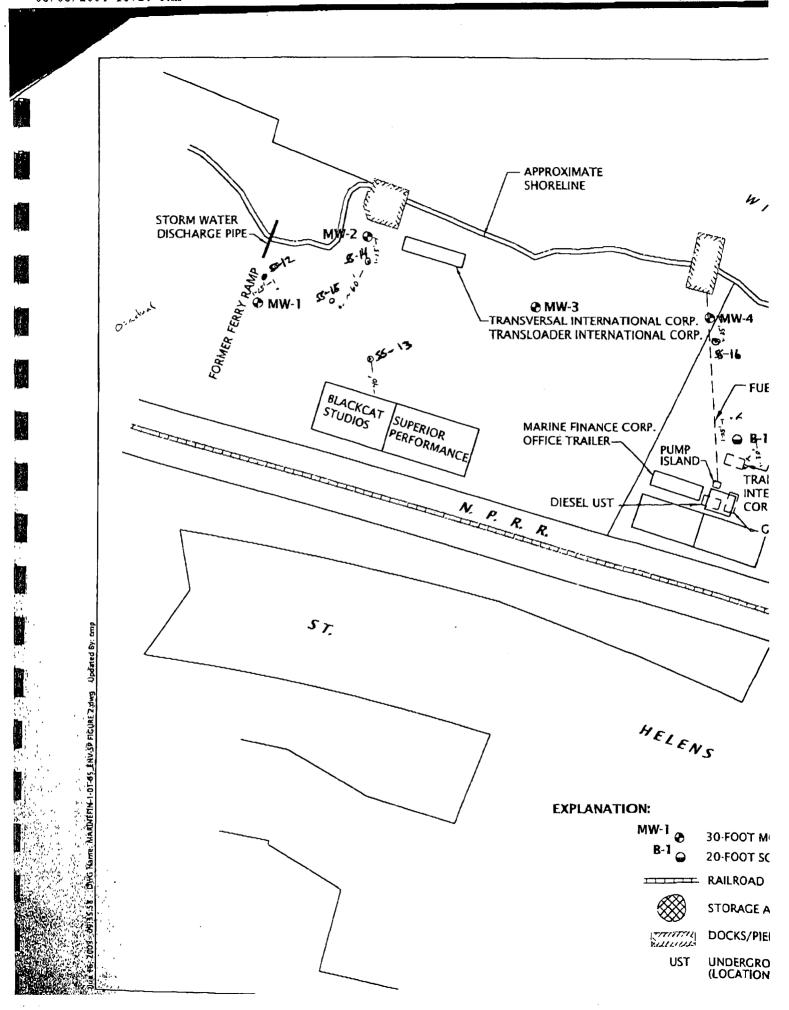
Fax Transmittal

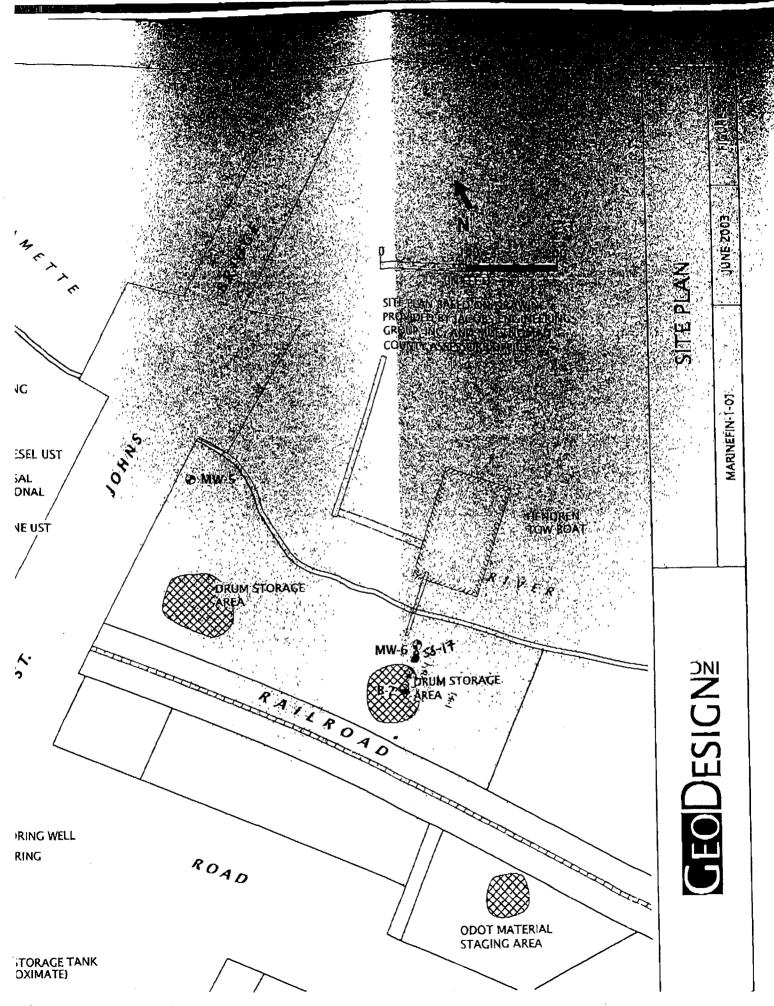
				
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VANCOUVER

SEATTLE

PORTLAND ■

FAX TRANSMITTAL

3121 Moo	dy Avenue, Suite 200 Portland, OR 9	97239 Phone 971.544.2139 Fax 971.544.2140
		PROJECT/TASK NO .: Marine Finance Corp. Prop.
То:	Chris Reive	DATE: 3/5/04
	Debra Braddock	FAX#: 503.598,7373
RE:	Marine France Proj	perty Pages: (4)
From:	ASJ	Maul Foster & Alongi, Inc Portland
_		

Unless otherwise indicated or abvious from the nature of the transmittal, the information contained in this facsimile message is confidential information intended for the use of the individual or entity named above. If the reader of this message is not the intended recipient, or the employee or agent responsible to deliver it to the intended recipient, you are hereby natified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us at the telephone number listed above.

COMMENTS:

Here is a map of surface soil locations for your reference,

Maul Foster & Alongi, Inc. provides private and public sector clients with high-quality, practical, solution-oriented environmental consulting and engineering services that are recognized by our clients for their quality, value, and merit.

- Air Emissions Modeling
- Aquifer Testing and Well Design
- Brownfield Redevelopment
- Civil Engineering
- Construction Management and Inspection
- Corrective Action Plans
- Cost Analyses
- Data Management
- Environmental Management Systems
- Environmental Compliance Audits

- Expert Witness Testimony
- Feasibility Studies
- Geotechnical Engineering
- Groundwater Modeling and Monitoring
- Hydraulic, Geologic, and Hydrogeologic Assessments
- Permitting
- Prospective Purchaser Agreements
- Property Transaction Assessments
- Regulatory Agency Liaison
- Regulatory Support/Negotiation

- Regional Aquifer Protection and Planning
- Remedial Investigation
- Remediation System Design and Installation
- Remediation System Operation and Maintenance
- Risk Assessment
- Risk Communication
- Site Grading and Paving
- Stormwater Detention and Treatment System Design
- Water Quality Assessment

TABLE 7 Summary of Groundwater and Surface Water Analytical Data Polynuclear Aromatic Hydrocarbons (PAHs) Marine Finance Corporation Portland, Oregon

Sample 1.D.	Date	PAHs by EPA Method 8270SIM (µg/L)									
		Acenaphthene	Benzo (ghi) perylene	Chrysene	Fluoranthene	Fuorene	Naphthalene	Phenanthrene	Ругепе	Others	All
MW-1	04/15/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND	
	07/22/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND	
MW-2	04/15/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND	ND
	07/22/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND	ND
MW-3	04/15/03	0.490	ND<0.100	ND<0.100	0.795	ND<0.100	ND<0.100	0.117	1.11	ND	
	07/24/03	1.060	ND<0.100	ND<0.100	1.02	0.157	ND<0.100	1.400	1.48	ND	
MW-4	04/15/03	0.808	0.100	0.113	0.168	ND<0.100	0.135	0.134	0.649	ND	
	07/24/03	1.14	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	0.274	ND	
MW-5	04/15/03	0.196	ND<0.100	ND<0.100	0.134	ND<0.100	ND<0.100	0.277	0.666	ND	
	07/24/03	0.725	ND<0.100	ND<0.100	0.269	ND<0.100	N	0.693	1.03	ND	
MW-6	04/15/03	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND	ND
	07/22/03	0.402	ND<0.100	ND<0.100	0.103	ND<0.100	ND<0.100	ND<0.100	ND<0.100	ND	ND
DEQ Generic RBCs											
Groundwater Ingest	ion- Occupational	2,700		17a	1,800a		890		1,300a	Varies	
Volatilization to Out	tdoor Air- Occupational	4,200b		2b	210b		31,000b		140b	Varies	
Vapor Intrusion into	Buildings- Occupational	4,200b		2b	210b		31,000b		140b	Varies	
Ingestion and Inhala	ation from Tap Water- Occupational	620					8.7			Varies	
Groundwater in Excavation- Excavation Worker											
Ecological Risk, Agu	uatic	0.52			0.00616		0.62	0.0063			**
EPA Region 9 Tap W		4,200b		2b	210b		240b		140b	Varies	
		370		9.2	1,500		6.2		180	Varies	

Notes:

VOCs: volatile organic compunds

PAHs: polynuclear aromatic hydrocarbons

EPA: U.S. Environmental Protection Agency

μg/L: micrograms per liter
ND: Not detected above laboratory reporting methods.

DEQ: Oregon Department of Environmental Quality

RBCs: risk-based concentrations

--: not analyzed/applicable

a - >S: This groundwater RBC exceeds the solubility limit. Groundwater concentrations in excess of S indicate that free product may be present. b - =S: This number is not a risk-based concentration.

PRG: preliminary remediation goal

TABLE 8¹ Summary of Surface Soil Chemical Analytical Data Marine Finance Corporation Site Portland, Oregon

						1		
Sample ID	Date		m Hydrocarbons I-Dx (mg/kg)	Total Meta Method 6 Series (000/7000	TCLP Metals by EPA 1311/6000/7000 Series(mg/L)		
		Diesel-range	Heavy Oil-range	Arsenic	Lead	Arsenic	Lead	
SS-12	8/20/2003	ND<500	1170	3.77	42.1		ND<0.100	
SS-13	8/20/2003	ND<25.0	ND<50.0	1.1	4.16			
SS-14	8/20/2003	51.0	66.4	4.07	21.1			
SS-15	8/20/2003	ND<25.0	ND<50.0	13.4	30	ND<0.100		
SS-16	8/20/2003	34.0	164	7.06	30			
SS-17	8/20/2003	ND<25.0	ND<50.0	2.57	21.4			
SS-18	8/20/2003	ND<25.0	ND<50.0	2.77	34.6			
SS-19	10/15/2003	ND<25.0	ND<50.0	4.08	6.43			
SS-20	10/15/2003	ND<25.0	ND<50.0	3.63	26.3			
SS-21	10/15/2003	32.3	142	12.3	136			

notes:

1. Chemical analyses performed by North Creek Analytical of Beaverton, Oregon

mg/kg: millgrams per kilogram

TCLP: Toxic Characteristic Leaching Procedure ND: not detected above method reporting limits

--: not apllicable

TABLE 6 Summary of Groundwater Analytical Data Total Metals Marine Finance Corporation Portland, Oregon

Sample I.D.	Sample Date						by EPA Me	Total Metals thod 6000/7000 (mg/L)	1								
		Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc			
MW-1	04/15/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00500			
	07/22/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00500			
MW-2	04/15/03	ND<0.00100	0.00139	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	ND<0.00100	0.00138	ND<0.00100	ND<0.00500			
	07/22/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	0.00123	ND<0.00100	ND<0.00100	ND<0.00500			
MW-3	04/15/03	ND<0.00100	0.0012	ND<0.00100	ND<0.00100	0.00183	0.00218	0.00117	ND<0.000200	0.00413	ND<0.00100	ND<0.00100	ND<0.00100	0.00774			
	07/24/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	0.00105	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	0.00171	ND<0.00100	ND<0.00100	ND<0.00500			
MW-4	04/15/03	0.00101	0.0195	0.00357	0.00202	0.182	0.43500	0.692	0.000973	0.139	0.00103	0.01490	ND<0.00100	0.63500			
	07/24/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	0.00123	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	0.00329	ND<0.00100	ND<0.00100	ND<0.00500			
MW-5	04/15/03	ND<0.00100	0.00286	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	0.00119	ND<0.00100	ND<0.00100	ND<0.00500			
	07/24/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	0.00114	ND<0.00200	ND<0.00100	ND<0.000200	ND<0.00200	0.00168	ND<0.00100	ND<0.00100	0.00758			
MW-6	04/15/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	0.00227	0.00173	ND<0.000200	0.00303	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00500			
	07/22/03	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00100	ND<0.00200	ND<0.00100	ND<0.000200	0.0031	0.00105	ND<0.00100	ND<0.00100	0.00683			
DEQ Generic RBC																	
Occupational Groundwater Ingestion								0.015									
Ecological Risk, A	_	1.6	0.15	0.0053	0.0022	0.011	0.009	0.0025	0.00077	0.052	0.005	0.00012	0.04	0.12			
EPA Region 9 Tap		0.015	0.000045	0.073	0.018	55*	1.5		0.011	0.73**	0.18	0.18	0.024	11			

Notes:

μg/L: micrograms per liter mg/L: milligrams per liter

EPA: U.S. Environmental Protection Agency

--: not analyzed/applicable

ND: Not detected above laboratory reporting methods. DEQ: Oregon Department of Environmental Quality

RBCs: risk-based concentrations PRG: preliminary remediation goal

*: Chromium III

**: Soluble Salts

TABLE 9 Summary of Surface Soil Chemical Analytical Data ¹ Marine Finance Corporation Site Portland, Oregon

Sample I.D	Date	PAHs by EPA Method 8270M-SIM (µg/kg)															
Sample I.D	Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(ah)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
SS-12	08/20/03	ND<268	ND<268	ND<268	ND<268	330	303	381	277	281	ND<268	337	ND<268	282	ND<268	ND<268	391
SS-13	08/20/03	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4	ND<13.4
SS-14	08/20/03	ND<26.8	ND<26.8	ND<26,8	46.3	66.3	81.1	103	40.1	65.9	ND<26.8	89.4	ND<26.8	70.3	ND<26.8	56.6	94.8
SS-15	08/20/03	64.3	ND<26.8	26.8	147	171	181	146	147	190	45.6	323	57.5	127	63.3	. 250	323
SS-16	08/20/03	70.9	36	35.6	223	361	297	472	253	274	79	369	51	337	ND<26.8	132	497
SS-17	08/20/03	57.4	ND<13.4	20.8	171	244	254	219	192	201	56.2	271	39	181	ND<13.4	134	295
SS-18	08/20/03	42	ND<26.8	ND<26.8	97.4	129	165	131	96.3	124	31.9	165	30.4	108	ND<26.8	84.6	177
SS-19	10/15/03	35.1	ND<13.4	ND<13.4	19.9	18.6	17.1	ND<13.4	18.3	22.1	ND<13.4	48.4	34.4	ND<13.4	ND<13.4	29.5	43.7
SS-20	10/15/03	23.7	ND<13.4	17.2	102	141	120	124	130	153	25.5	156	14.3	102	ND<13.4	60.2	172
SS-21	10/15/03	48.3	44.5	76.2_	516	692	541	583	541	631	117	957	47.7	466	ND<33.5	476	1180

notes:

1. Chemical analyses performed by North Creek Analytical of Beaverton, Oregon.
PAHs: polynulclear aromatic hydrocarbons

µg/kg: micrograms per kilogram

ND: not detected above method reporting limit

PHONE MEMO FILE: 6/30/03 DATE: TIME: CALL FROM TO, Paul TRINE TITLE: COMPANY: GEODESIAN LOCATION: PHONE NO: (503) 968 - 6787 CC: Manne RE: **SUMMARY OF CALL:** SIGNATURE:

VOLUNTARY CLEAN UP AND SITE ASSESSMENT



Department of Environmental Quality

811 SW Sixth Avenue Portland, OR 97204-1390 503-229-5696 TTY 503-229-6993

July 21, 2003

BY FACIMILE AND SURFACE MAIL

Gordon Carey 721 SW Oak St 2nd Floor Portland, Oregon 97205

Re:

Marine Finance Site property 8444 NW St. Helens Road ECSI #2352

Dear Mr. Carey:

As you know, the Department of Environmental Quality (DEQ) has performed environmental investigation and cleanup actions at the Marine Finance property. Before undertaking the actions, the DEQ determined that the property owner and responsible party, Marine Finance Corporation, had no financial ability to undertake or pay for the necessary actions. Therefore, DEQ's actions at the site were financed by the state's Orphan Site account. DEQ use of Orphan Account funds does not relieve responsible parties from liability for cleanup expenses. To the extent responsible parties are able to pay for cleanup costs, DEQ is obligated to recover the state's costs. As of June 30, 2003, DEQ had incurred costs of \$118,866.96 for actions at the Marine Finance site.

Mark Pugh, DEQ's project manager for cleanup of the Marine Finance property, has informed me that the property owner has proposed to enter DEQ's Voluntary Cleanup program (VCP) and complete all remedial actions at the property necessary for DEQ to issue a letter of No Further Action (NFA), after which the property reportedly would be sold.

DEQ is encouraged that the owner has finally decided to undertake cleanup actions at the property, and DEQ is prepared to work with Marine Finance to accomplish that end. However, as DEQ has informed you in the past, before DEQ can agree to work with Marine Finance in the VCP program or issue an NFA, DEQ requires that Marine Finance, a prospective purchaser, or other responsible entities or individuals enter into an agreement for reimbursement of DEQ's past costs. A noted above, to the extent responsible parties are able to pay for cleanup costs, DEQ is obligated to recover the state's costs. Reasonably, DEQ's actions contributed substantially to the value of the property and, therefore, the state should be reimbursed for its costs.

Gordon Carey July 21,2003 Page 2

DEQ is willing to work with Marine Finance to complete site cleanup, provided we reach agreement on reimbursement of the state's costs at the site. If Marine Finance is prepared to move forward, please contact me at (503) 229-6461 at your convenience to discuss the form and substance of the reimbursement agreement mentioned above.

Sincerely,

Charles Landman

cc: Mark Pugh, NWR



Oregon

John A. Kitzhaber, M.D., Governor

Department of Environmental Quality

Northwest Region Portland Office 2020 SW 4th Avenue, Suite 400 Portland, OR 97201-4987 (503) 229-5263 FAX (503) 229-6945 TTY (503) 229-5471

December 12, 2002

Gordon T. Carey, Jr.
721 SW Oak Street 2nd Floor
Portland, Oregon 97205

Re: DEQ Project Costs and
Scope of Work for Further Investigation
Marine Finance Site
8444 NW St. Helens Road,
Portland, Oregon
ECSI#2352

row, picking of the actual

Dear Mr. Carey: The street of the street of

Through communication with Charlie Landman you have requested that the Oregon Department of Environmental Quality (DEQ) provide detailed DEQ project costs for the Marine Finance Corporation site. Enclosed please find invoices and direct labor summaries for the costs incurred by the Oregon Department of Environmental Quality (DEQ) between February 1999 and November 1, 2002. The invoice for November 2002 is pending, but will total approximately \$200.

Figure 1. The State of the Configuration of the State of the Research Configuration of the

DEQ's costs were incurred using the Orphan Site account. Oregon's Environmental Cleanup Law (Oregon Revised Statutes (ORS) 465.381) established an Orphan Site account to investigate and clean up hazardous substance contamination at high priority sites where the responsible party is unknown, unwilling, or unable to undertake the required actions. DEQ determined that Marine Finance was an "unwilling" party, therefore, DEQ performed the required Expanded Preliminary Assessment (XPA) using our environmental contractor at the time, Jacob's Engineering. DEQ's determination is documented in the Orphan Declaration Memorandum signed July 6, 2000.

The total project cost as of 11/01/02 is \$116,553.90. Costs included in this total that were incurred by DEQ's contractor, Jacobs Engineering, totaled \$64,629.10.

The following is a summary of the work conducted by DEQ that resulted in the incurred charges.

In February 1999, DEQ's Site Assessment Section (SAS) sent an information request letter to Marine Finance and began preparation of a Strategy Recommendation Memorandum to document environmental conditions and priority for further action at the site. The Strategy Recommendation was finalized on September 27, 1999. DEQ's SAS determined the site was a high priority for completion of a Preliminary Assessment with sampling, also referred to as an Expanded Preliminary Assessment (XPA). After several months of correspondence DEQ declared the site an Orphan project in July 2000 after determining that Marine Finance



Corporation was unwilling to investigate or clean up the site. DEQ retained Jacobs Engineering to complete the Expanded Preliminary Assessment (XPA). Jacobs collected soil, groundwater and sediment samples at the site in August 2000, and submitted the XPA report in November 2000. DEQ completed removal of abandoned waste containers, drums, and batteries at the facility in May 2001. The XPA included collection of six groundwater samples, five Willamette River sediment samples, and thirteen soil samples. In general, samples were analyzed for metals, total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs; except sediments), semi-volatile organics (SVOCs), total organotins (includes tributyltin (TBT)), and polychlorinated biphenyls (PCBs).

Scope of Work for Completion of Site Characterization

18477 / 2 101

In general, the results of the XPA indicate the contamination is not widespread at the site. However, DEQ has determined that further work is needed to complete the site characterization. The additional data will allow a determination of to be made as to whether the site is a current source of contaminants to the Willamette River. This determination is consistent with the United States Environmental Protection Agency (EPA) requirements for all potential contaminant sources within the Portland Harbor area.

For your information a general scope of work that DEQ will require for completion of the site characterization is as follows:

- Collection of additional surface soil samples at approximately 10 locations to better define the lateral extent of surface soil contamination
- Soil sampling from at least two discrete depth intervals at locations with the highest contaminant levels in surface soil (SS-2, SS-7, SS-9), and from the former UST location.
- Installation and quarterly monitoring (one year minimum) of approximately six (6) monitoring wells across the eastern side of the property to assess shallow groundwater contaminants potentially discharging to the Willamette River.

Depending on the results of the additional investigation, DEQ may require a DEQ-approved soil management plan. This document would provide guidance during future construction activities in the event contaminated soils are encountered or otherwise require excavation to facilitate site development.

In addition to further site characterization activities, DEQ may require a deed restriction on groundwater use at the site (i.e., no wells could be installed for industrial, commercial or drinking water purposes). Based on the results of the further investigation, DEQ will determine whether additional actions are necessary to assure protection of human health or the environment. For example, a site cap (gravel or pavement, if not covered by structures) may be required to limit contact with site soils and a storm water management plan (collection system and monitoring plan) may be needed to prevent discharges to the river.



If you have any questions or comments about the information presented in this letter, please contact me at (503) 229-5587.

Sincerely,

Mark Pugh, Project Manager Cleanup and Spills

Attachment: Project Invoices and Daily Time Logs

cc: Charlie Landman, DEQ (w/o attach.)

Rod Struck, DEQ CU/PH (w/o attach.)

Dale Burkholder, Gibson, Bowles, Inc. (w/o attach.)

ECSI file #2352 (w/o attach.)



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William Burner Harris

DEQ SITE ASSESSMENT PROGRAM - STRATEGY RECOMMENDATION

Site Name: Marine Finance Corp.

Site CERCLIS Number: (none)

DEQ ECSI Number: 2352

Site Address: 8444 NW St. Helens Road

Portland, Oregon 97231

Recommendation By: Tom Gainer, Voluntary Cleanup and

Site Assessment Section, DEQ Northwest

Region

Approved By: Michael E. Rosen, Portland Harbor

Manager, DEQ Northwest Region

Date: September 27, 1999

NOTE: This site (Figures 1 and 2) is within a 6-mile stretch of the Lower Willamette River in which the U.S. Environmental Protection Agency (EPA) conducted a sediment study in 1997. This area, referred to as the *Portland Harbor*, is between the upstream ends of Sauvie Island (River Mile 3.5) and Swan Island (RM 9.5). The purpose of this Strategy Recommendation is to determine whether a specific hazardous substance release or a specific past operation at the site can be linked to contamination documented by EPA in sediments adjacent to the site. Because of this focus, the Strategy Recommendation may omit some historical site information, regulatory issues, or further-action conclusions that might otherwise be included in a DEQ Strategy Recommendation.

Background, Portland Harbor Sediment Evaluation

In September and October 1997, EPA's contractor, Roy F. Weston, Inc., collected 187 near-shore sediment samples within the Portland Harbor area defined above. Most samples (150) were collected as shallow grab samples within the upper 6 to 17 centimeters (cm) of sediments. 37 deeper composite core samples, from depths of between 55 and 139 cm, were also collected. All samples were analyzed for total metals, semi-volatile organic compounds (SVOCs), total organic carbon (TOC), and sediment grain size. Selected samples were also variously analyzed for organotins (TBTs), pesticides,

polychlorinated biphenyls (PCBs), chlorinated herbicides, and polychlorinated dioxins and dibenzofurans.

Based on analytical results from this study, which showed extensive sediment contamination, EPA is currently considering Portland Harbor for inclusion on the federal National Priority List (NPL - also known as Superfund).

Between late 1998 and mid-1999, DEQ examined EPA's analytical data to determine potential sources for sediment contamination in the Harbor. Potential sources associated with the most contaminated areas of sediment were sites already active in DEQ's Cleanup Programs.

DEQ categorized other areas of sediment contamination (i.e., those areas not thought to be associated with active Cleanup Program sites) by defining the areas:

- having the highest detected concentration of a given contaminant;
- with contaminant concentrations in the upper five percent of a given contaminant's detected concentrations; and
- having contaminant concentrations above an apparent "baseline range" most commonly detected throughout the harbor area.

DEQ categorized in this manner because there are no established freshwater sediment contaminant concentration guidelines or well-defined background contaminant concentrations for the harbor area. The contaminant "baseline range" was developed by examining the geometric distribution of concentrations for each contaminant detected. Any sediment concentrations that appeared to depart significantly from the ranges most commonly detected were suspected of lying near a potential contaminant source.

One subsurface sediment sample (SD055-C) was collected at a depth of 0 -90 centimeters adjacent to the Marine Finance facility (Figure 3). In addition, one shallow sediment sample was collected downstream (SD055) and both shallow (SD057) and subsurface (SD057-C) sediment samples were collected upstream of the Marine Finance site.

Sediment data summarized in Table 1 indicates that the following contaminants were detected adjacent to the site (sample SD055-C) at concentrations exceeding the maximum baseline level estimated for Portland Harbor: copper, lead, mercury, nickel, zinc, 2-methylnaphthalene, carbazole, dibenzofuran, low and high molecular weight polycyclic aromatic hydrocarbons (LPAHs and HPAHs, respectively), and total organic carbon. These contaminants are

typically associated with activities such as the use, storage, and handling of petroleum fuels (e.g., diesel), pesticides, and metals, and with combustion of materials. The mercury concentration is only slightly above the baseline level and may not be a concern at this site.

The upstream shallow sediment sample (SD057) showed elevated levels of carbazole and LPAHs, and the subsurface sediment sample from the same location (SD057-C) showed elevated levels of mercury, benzoic acid, LPAHs and HPAHs. However, the contaminant concentrations observed in the upstream samples are generally lower than in the sample adjacent to the Marine Finance site. This, and the relatively low concentrations observed in the sample collected downstream of Marine Finance (SD055), indicates that the Marine Finance site is a probable source for the contamination observed adjacent to the site in sample SD055-C.

The U.S. Army Corps' U.S. Moorings site is approximately one-half mile upstream (south) of the Marine Finance site. The 1995 Sediment Quality Evaluation conducted at the U.S. Army Corps site showed elevated concentrations of LPAHs, HPAHs, and DDT. However, lower sediment concentrations between the U.S. Moorings and Marine Finance sites at sample location SD057 indicate that the U.S. Moorings site does not appear to be a significant contributor to sediment contamination observed at the Marine Finance site. The upstream Gasco site may have contributed petroleum contamination to the U.S. Moorings and Marine Finance sites.

Operational History

According to information provided by the site owner to DEQ on March 2, 1999, the 9.7-acre site owned and operated by Marine Finance Corp. is currently used for office trailer storage, warehouses, and houseboat construction. There are currently two docks on site north of the St. John's Bridge. A cross-river ferry apparently docked at the northern end of the site prior to construction of the bridge. Hendren Tow Boat Company operates on Marine Finance property south of the St. John's Bridge. Since Hendren Tow Boat started operations at the site in 1993, it has been used as a tug boat dock. There are currently several floating structures/docks in the river adjacent to the site.

Historical references to the site include "REH Inc." Description of this historical operation was not readily available, except that three underground storage tanks (USTs) were apparently decommissioned from the property by REH Inc. in 1988 (see Regulatory History).

An aerial photograph from 1957 shows floating logs and other structures in the Willamette River adjacent to the site, indicating that wood processing and other docking operations may have been conducted at the site.

Regulatory History

UST file #11378: Three steel USTs were decommissioned at the site by REH, Inc. in 1988: one 20,000-gallon diesel UST, and a 10,000 and 5,000-gallon UST with unspecified contents. The location of the tanks and their condition at the time of decommissioning is unknown.

LUST file #26-88-0046: A release of diesel to soil associated with the UST decommissionings was reported on August 8, 1988. Remediation was completed and DEQ issued a no further action letter on February 17, 1989.

EPA ID #ORQ000005892: One time disposal of abandoned paint waste from a "dumping area" (notification dated March 20, 1997). The site's 1997 hazardous waste generator Annual Report indicates that the facility no longer generates hazardous waste.

In a January 1998 spill report, the U.S. Coast Guard (USCG) observed numerous drums of oily rags, antifreeze, etc., with housekeeping and storage concerns at the Hendren Tow Boat site.

Site Hydrogeology

The site lies in the northern-most Portland Basin, a major north-southeast trending sediment filled structural depression found in the northern part of the Willamette River valley and adjoining Columbia River valley (Swanson et al, 1993). The basin is filled with recent alluvium, Pleistocene cataclysmic flood deposits, Miocene to Holocene nonmarine sedimentary rocks, and is underlain by Eocene to Miocene volcanic and sedimentary rocks that are exposed along the basin margins.

The youngest deposits are recent alluvium (silt, sand and gravel mixtures) characteristic of an active fluvial environment. These are made up of shoreline, river channel, and adjacent floodplain deposits.

The Marine Finance facility lies between U.S. Highway 30 (St.Helens Road) and the Willamette River, at the base of the Portland Hills. The facility was constructed on varying thicknesses of fill comprised of fine to medium sands and silts overlying alluvial floodplain deposits. Aquifers in the fill and floodplain deposits generally are unconfined and localized due to heterogeneity of the

deposits. Occurring at various depths in the site vicinity, Columbia River Basalts (CRB) underlie these alluvial deposits. Deep wells installed in fractured CRB can be very productive and important supply wells. Site elevation is about 30 feet above mean sea level.

Pathway Summary

The Marine Finance facility lies in an area of mixed industrial, commercial, and residential use. Approximately 22 residences lie within 1/4 mile of the facility. The residences are located on the west side of St. Helens Road_approximately 50 to 200 feet higher in elevation than the site, so surface or subsurface contaminant migration from the site to the residences is unlikely.

A perimeter fence limits public site access. However, trespassers or utility trench workers could potentially be exposed to surface and/or subsurface contaminants through direct contact, inhalation, or incidental ingestion.

Oregon Water Resources Department has well logs for one domestic well within one mile of the Marine Finance facility. The well appears to be approximately one-quarter mile from the site and is not likely affected by the contaminants at the Marine Finance facility. The nearest significant wetlands are located approximately 3 miles downstream at the mouth of the Multnomah Channel. Forest Park lies within 0.5 miles of the site.

Both recreational and subsistence fishing occur within the Lower Willamette River. Commercial fishing within the Portland Harbor is limited to a small Pacific lamprey fishery. Recreational boating, water skiing, swimming, and beach use also occur within the Harbor.

The Lower Willamette River provides habitat for 39 fish species, including populations of wild cutthroat trout, rainbow trout, and mountain whitefish. White sturgeon are plentiful within the Harbor. The Harbor is also an important migratory corridor, nursery habitat, and adult foraging area for two runs of chinook salmon, two runs of steelhead trout, and individual runs of coho and sockeye salmon.

Upper Willamette River populations of chinook and steelhead, which migrate through the Harbor, are listed as threatened species under the Federal Endangered Species Act. The Pacific lamprey is considered a federal species of concern.

Great blue herons, cormorants, osprey, mergansers, kingfishers, peregrine falcons, and bald eagles routinely forage within the Harbor. The area is also part of the wintering range for the Aleutian Canada goose. All are protected under the Migratory Bird

Treaty Act. The peregrine falcon is federally listed as an endangered species, while the Aleutian Canada goose is federally listed as threatened species. The bald eagle also is a threatened species, but was recently proposed to be removed from this list.

There is little data on the nature and extent of the benthic community within Portland Harbor sediments. However, it is known that contamination in the benthos, which is a protected beneficial use, can be the source of food-chain effects that radiate up to the species listed above, including humans.

The Lower Willamette River is water quality limited for the following toxic compounds:

- Dioxins/furans (water column and sediments);
- Mercury (fish tissue);
- Pesticides (water column and sediments);
- Polynuclear Aromatic Hydrocarbons PAHs (water column and sediments); and
- Trace metals (water column and sediments).

DEQ's Water Quality Division is developing Total Maximum Daily Load requirements (TMDLs) within the lower Willamette River for these contaminants. A TMDL for 2,3,7,8-TCDD was established in 1991.

Conclusions/Recommendations

NOTE: As indicated previously, this review is limited to establishing a link between site activities and contamination in adjacent Portland Harbor sediments. It does not necessarily represent a thorough review of available site data, and the conclusions and recommendations presented below may reflect this limited focus.

The following conclusions are based on the contents of this review:

- It appears that site activities have resulted in sediment contamination adjacent to the site. Elevated concentrations of sediment contaminants adjacent to the site (copper, lead, nickel, zinc, 2-methylnaphthalene, carbazole, dibenzofuran, LPAHs, and HPAHs) are consistent with current and historical site activities. PAH contaminants found in the sediment are associated with handling/storage of petroleum products, carbazole and dibenzofuran are often found in heavy petroleum products and petroleum combustion products, and metals are associated with construction and boat use/maintenance.
- The current and historical use of the site's docks, possibly for conveyance of materials and boat fueling, construction, and

maintenance, is a likely source of sediment contamination by routine or accidental activities.

- Poor waste management/housekeeping described in the Coast Guard report indicates that such subsurface or surface contaminant migration is quite possible at the Hendren Tow Boat site.
- Contaminant concentrations observed in the upstream and downstream sediment samples are generally lower than in the sample adjacent to the Marine Finance site. This indicates that the Marine Finance site is a probable source for the contamination observed adjacent to the site.
- In addition to direct deposition of contaminants into or on to the river adjacent to the site, other possible migration pathways resulting in sediment contamination from the site include subsurface migration (from dumping, spills, leaks from USTs or pipelines) and stormwater runoff.

Contamination of river sediments adjacent to the Marine Finance site may represent a significant threat to human health and aquatic life within the river. An Expanded Preliminary Assessment (XPA) on the entire property (Marine Finance and Hendren Tow Boat) should be conducted to evaluate sediment contamination, potential upland site contaminant sources, and past waste management practices and to determine the extent and source(s) of observed sediment contamination. Sediment sampling should include subsurface samples to further define the extent of contamination. As necessary, the XPA should present recommendations aimed at preventing potential further contamination of adjacent sediment. DEQ has determined that these actions warrant a high priority for follow-up.

There is insignificant information to propose adding the site to DEQ's Confirmed Release List or Inventory.

References

DEQ consulted the following general references in preparing this Strategy Recommendation:

- 1. Marine Finance Corp. response to DEQ Site Assessment Information Request, March 1999.
- 2. Hendren Tow Boat Corp. response to DEQ Site Assessment Information Request, March 1999.
- 3. Portland Harbor Sediment Investigation Report, prepared by Roy F. Weston, Inc. for USEPA, May 1998.

- 4. U.S. Moorings 1995 Sediment Quality Evaluation, prepared by the U.S. Army Corps, March 1996.
- 5. DEQ LUST Database.
- 6. DEQ HWIMSy Hazardous Waste Generator Database.
- 7. DEQ SPINS Spill Database.
- 8. MetroScan Property Records, Multnomah County, Oregon.

Attachments

- Table 1: River Sediment Concentrations (1997)
- Figure 1: Site Location Map
- Figure 2: Site Property Boundary Map
- Figure 3: Sediment Sampling Points, 1997 Portland Harbor Sediment Investigation

- 3. Portland Harbor Sediment Investigation Report, prepared by Roy F. Weston, Inc. for USEPA, May 1998.
- 4. U.S. Moorings 1995 Sediment Quality Evaluation, prepared by the U.S. Army Corps, March 1996.
- 5. DEQ LUST Database.
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Attachments

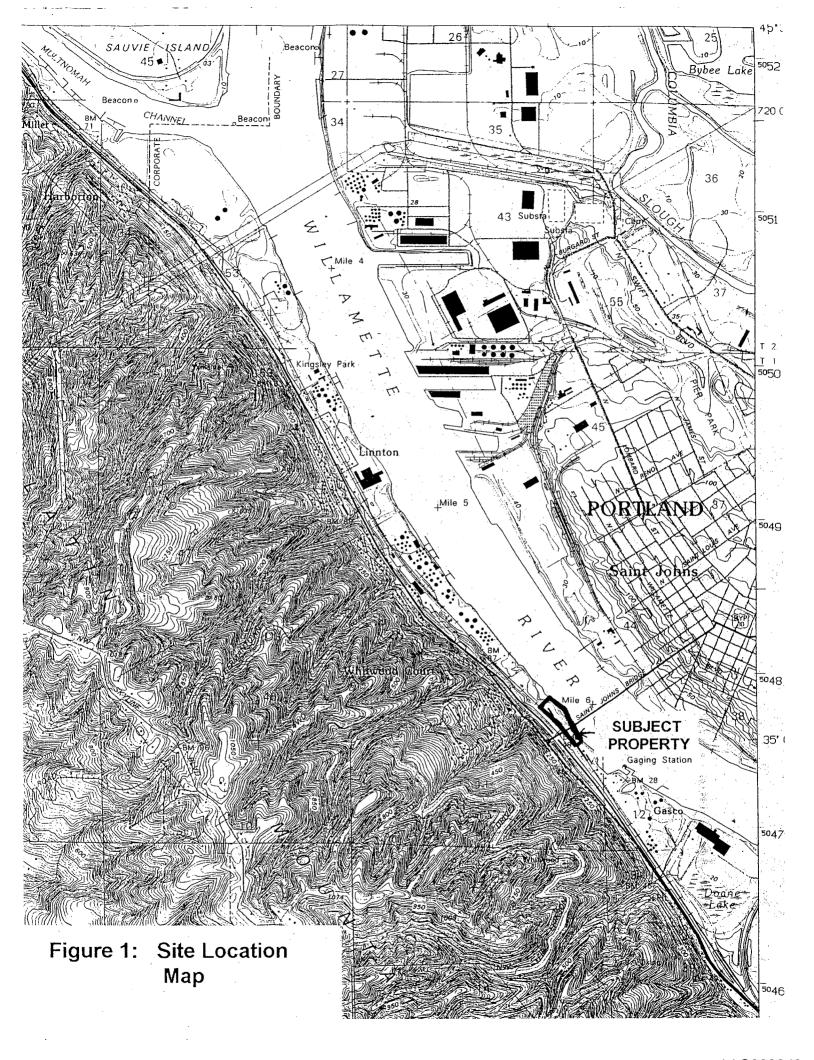
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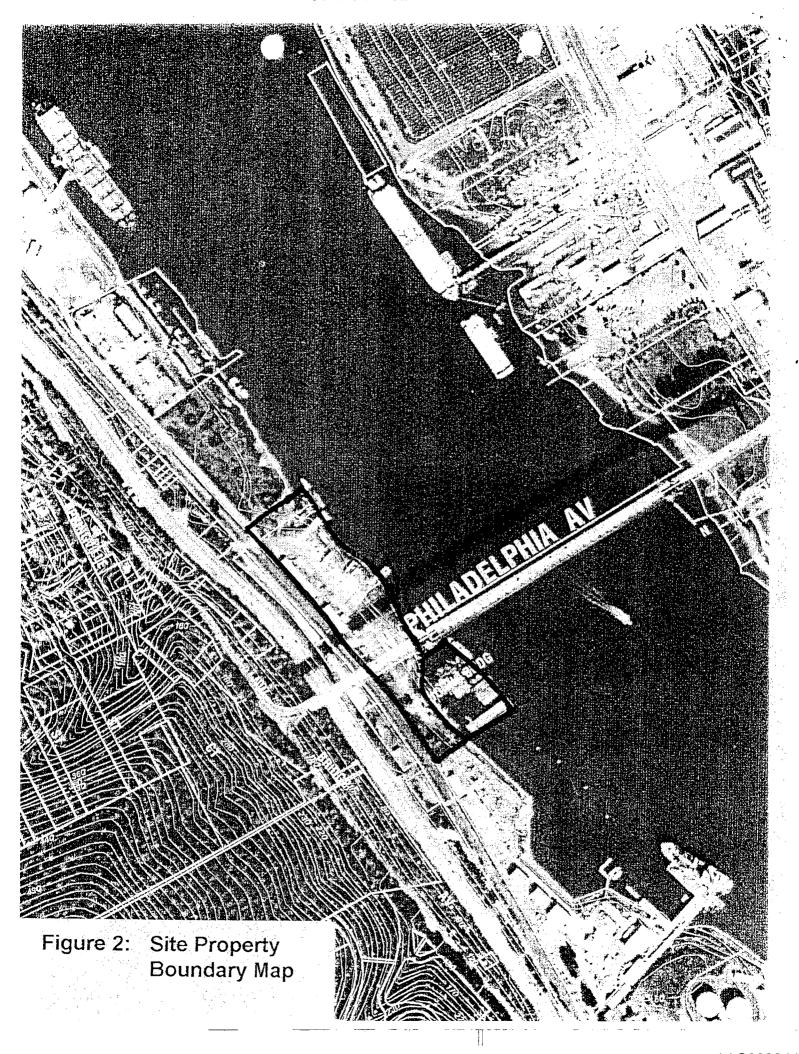
TABLE 1

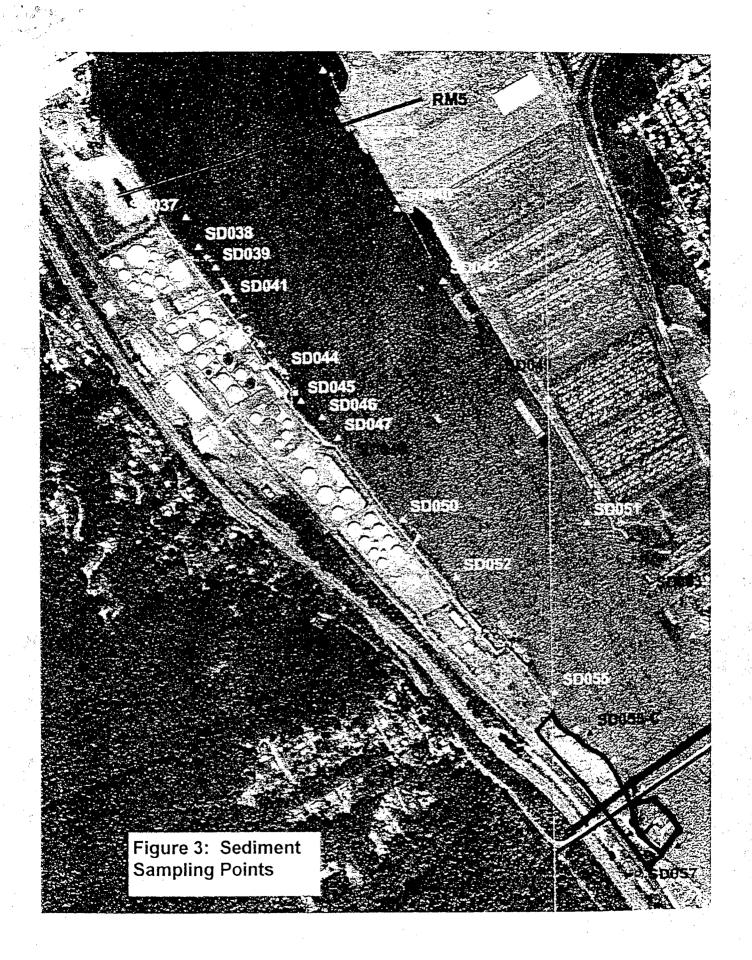
River Sediment Contaminant Concentrations (1997)

Marine Finance Corp.

			_	_		Apparent
						Portland Harbor
		Down-	Marine	Up-	Up-	Sediment
		Stream	Finance	Stream	Stream	Baseline
Contaminant	Units	SD055	SD055-C	SD057	SD057-C	Maximum Value
Aluminum	ppm .	16600	35000	37500	35400	42800
Antimony	ppm'	<4	ÑΑ	<5	NA	<5
Arsenic	ppm	<4	<8	<5	<4.	<5
Barium	ppm	111	180	171	175	195
Beryllium	ppm	0.39	0.6	0.63	0.62	0.7
Cadmium	ppm	0.2	0.6	0.3	0.3	0.6
Chromium	ppm	18.6	36.6	35.2	33.9	41
Cobalt	ppm	12.9	18.8	17.7	16.6	19.7
Copper	ppm	18.8	64	37.8	36.8	60
Iron	ppm	29800	42100	39900	38900	45000
Lead	ppm	9	31	9 .	16	30
Manganese	ppm	356	607	619	524	810
Mercury	ppm	0.02	0.13	0.04	0.15	0.1
Nickel	ppm	17.3	33	28	28.1	32
Selenium	ppm	9	<8	14	- 11	15
		0.7	1.3	0.9	1.1	1.4
Silver Thallium	ppm	<4	<8	<5	7	13
Titanium	ppm	1520	1790	1910	1870	2075
Vanadium		71.9	100	100	96.3	112
Zinc	ppm	67.3	178	89.6	91.3	118
	ppm	<19	1400	45	60	150
2-Methylnaphthalene	ppb	<19	<190	<19	85	680
4-Methylphenol	ppb	<190	<1900	<190	240	<200
Benzoic Acid	ppb	<19	<190	<19	<20	<20
Benzyl Alcohol	ppb	<73	<190	<120	<31	390
bis(2-Ethylhexyl)phthalate	ppb	<19	<190	<19	<20	<20
Butylbenzylphthalate	ppb	31	370	210	34	100
Carbazole	ppb	<19	<190	<19	<20	<20
Di-N-Butylphthalate	ppb :	<19	<190	<19	<20	<20
Di-N-Octylphthalate	ppb		1300	52	32	100
Dibenzofuran	ppb	<19	81 . I	<19	<20	<20
Dimethylphthalate	ppb	<19	<190	<96	<2 0	Detect
Pentachlorophenol	ppb	<97	<970	:1	<20	<20
Phenol	ppb	<19	<190 69410	<19 9 32	3447	700
LPAHs (total)	_ ppb	212	3	2085	18950	2400
HPAHs (total)	ppb	1750	136300	3	5	220
DDTs (total)	ppb	6.5	94	11		El .
PCBs (total)	ppb	<39	<350	<38	<40	<180
Organotins (total)	ppb	<30	85	43	<30	300
2,4-D	ppb	NA	NA	NA	NA	<3.3
2,4-DB	ppb	NA	NA 0.0	NA .	NA	<5
TOC	%	.1	2.2	1.2	1.2	2
					*	
Water Depth	FI	23	23	13	13	•
Sediment Sample Depth	cm	0-10	0-90	0-10	0-90	* .







DEQ SITE ASSESSMENT PROGRAM - STRATEGY RECOMMENDATION

Site Name: Marine Finance Corp.

Site CERCLIS Number:

(none)

DEO ECSI Number:

ECSI #2352

Site Address:

8444 NW St. Helens Road, Portland, Oregon

Recommendation By:

Mark Pugh, Cleanup and Portland Harbor, DEQ Northwest

Region

Approved By:

Michael E. Rosen, Portland Harbor Manager, DEQ Northwest Region

Date:

September 30, 2002 (revised)

Introduction

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This revised Strategy Recommendation for the Marine Finance Site (Figure 1) is an addendum to the Oregon Department of Environmental Quality's (DEQ's) Strategy Recommendation dated April 21, 1999. At that time the site was assigned a high priority for completion of an Expanded Preliminary Assessment (XPA) to evaluate sediment contamination, potential upland site contaminant sources, and past waste management practices, and to determine the extent and source(s) of observed sediment contamination. Because the Responsible Party was unwilling to conduct the XPA, DEQ issued a task order to Jacobs Engineering for completion of the XPA using DEQ's Orphan Site Account funding. This memorandum focuses on the findings of the XPA and the associated drum removal action, and additional site characterization tasks. A discussion of background information can be found in the initial Strategy Recommendation Memorandum dated April 21, 1999.

Portland Harbor Sediment Evaluation Results

In September and October 1997, EPA's contractor, Roy F. Weston, Inc., collected 187 near-shore sediment samples within the Portland Harbor area defined above. Most samples (150) were collected as shallow grab samples within the upper 6 to 17 centimeters (cm) of sediments. 37 deeper composite core samples, from depths of between 55 and 139 cm, were also collected. All samples were analyzed for total metals, semi-volatile organic compounds (SVOCs), total organic carbon (TOC), and sediment grain size. Selected samples were also variously analyzed for organotins (TBTs), pesticides, polychlorinated biphenyls (PCBs), chlorinated herbicides, and polychlorinated dioxins and dibenzofurans. Based on analytical results from this study, which showed extensive sediment contamination, EPA proposed Portland Harbor for inclusion on the federal National Priority List (NPL) in December 2000.

Locations and analytical results for samples collected by EPA in the vicinity of the site are shown on Figure 2 and Table 1, respectively. One subsurface sediment sample (SD055-C) was collected at a depth of 0-90 centimeters adjacent to the Marine Finance facility (Figure 2). In addition, one shallow sediment sample was collected downstream (SD055) and both shallow (SD057) and subsurface (SD057-C) sediment samples were collected upstream of the Marine Finance site.

Sediment data summarized in Table 1 indicates that the following contaminants were detected adjacent to the site (sample SD055-C) at concentrations exceeding the maximum baseline level for Portland Harbor: copper, lead, mercury, nickel, zinc, 2-methylnaphthalene, carbazole, dibenzofuran, low and high molecular weight polycyclic aromatic hydrocarbons (LPAHs and HPAHs, respectively), and total organic carbon. These contaminants typically are associated with activities such as the use, storage, and handling of petroleum fuels (e.g., diesel), pesticides, and metals, and with combustion. The mercury concentration is only slightly above the baseline level and may not be a concern at this site.

The upstream shallow sediment sample (SD057) showed elevated levels of carbazole and LPAHs, and the subsurface sediment sample from the same location (SD057-C) showed elevated levels of mercury, benzoic acid, LPAHs and HPAHs. However, the contaminant concentrations observed in the upstream samples are generally lower than in the sample adjacent to the Marine Finance site. This, and the relatively low concentrations observed in the sample collected downstream of Marine Finance (SD055), indicates that the Marine Finance site is a probable source for the contamination observed adjacent to the site in sample SD055-C.

The U.S. Army Corps' U.S. Moorings site is approximately one-half mile upstream (south) of the Marine Finance site. The 1995 Sediment Quality Evaluation conducted at the U.S. Army Corps site showed elevated concentrations of LPAHs, HPAHs, and DDT. However, lower sediment concentrations between the U.S. Moorings and Marine Finance sites at sample location SD057 indicate that the U.S. Moorings site does not appear to be a significant contributor to sediment contamination observed at the Marine Finance site. The upstream Gasco site may have contributed petroleum contamination to the U.S. Moorings and Marine Finance sites.

Expanded Preliminary Assessment

The XPA included advancing seven direct-push borings to collect subsurface soil (SB) and/or groundwater (GW) samples, collecting eleven surface soils samples (SS), two surface water samples (SW), and nine sediment samples (SD) from six locations (Figure 3). Table 2 shows a summary of contaminants in each media that exceed risk-based screening levels. Tabulated data from the XPA investigation can be found in Appendix D of the Expanded Preliminary Assessment Data Report (Jacobs Engineering, 2000).

For evaluation, analytical results were compared to appropriate risk-based concentrations (RBCs), including the United States Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals (PRGs) for tapwater and industrial use soils, and DEQ Ecological Risk Assessment Screening Level Values (SLV) for exposure of aquatic receptors to surface water or sediment. EPA ambient water quality criteria (AWQC) for chronic effects were compared to surface water concentrations and selected shallow groundwater concentrations. The Portland Harbor Baseline value for sediment, although not risk-based, also was used to assess the sediment results. The results of Total Petroleum Hydrocarbon (TPH) analysis and total organotins (e.g., tributyltin (TBT)) also are discussed below, although there are no established risk-based screening concentrations yet established for TPH, TBT or total organotins.

Polychlorinated biphenyls (PCBs) were not detected in site soil. Although PCBs were detected in each of the sediment samples at concentrations ranging from 8 ppb to 76 ppb, the upland site area does not appear to be a source of PCBs.

Soil

Elevated contaminant concentrations above screening concentrations occur primarily within surface soil (0-6 inches). Benzo(a)pyrene was detected in three of ten samples (SS-2, SS-7, SS-9), with each detected concentration above the PRG for industrial use soil (290 ppb). A number of other polycyclic aromatic hydrocarbons (PAHs) also were detected in these samples.

Arsenic and chromium also were detected above their respective PRGs. The arsenic concentrations, although generally above the PRG of 2.7 ppm, and as high as 13.3 ppm, may be within the naturally occurring range based on an average of 6 ppm for Clark County, Washington. Only one chromium concentration was above the PRG of 64 ppb for hexavalent chromium (SS-5, 81.3 ppm).

Arsenic was detected above its PRG in all three subsurface sample locations (SB-1, SB-2, SB-5). The arsenic concentrations ranged from 3.1 to 3.3 ppm and appear to be within the naturally occurring range for Clark County, Washington of 6 ppm.

TPH in Soil

TPH as diesel (TPH-D) and TPH as heavy oil (TPH-Oil) were detected in the majority of the eight surface soil samples and five subsurface soil samples analyzed. In general, TPH-Oil was detected at relatively higher concentrations than TPH-D.

TPH-Oil concentrations ranged from 110 ppm (SS-4, SS-5) to 9,800 ppm (SS-6). TPH-Oil was detected above 100 ppm in eight of thirteen samples. TPH-Oil was not detected in SB-1, SB-2, SB-3, SS-1 or SS-8.

TPH-D concentrations ranged from 27 ppm (SB-2) to 1,400 ppm (SS-6). TPH-D was detected above 100 ppm in four of thirteen samples (SB-4, SS-3, SS-4, SS-6). TPH-D was not detected in SB-1, SB-3, or SS-8.

The highest TPH concentrations were detected in surface soil at SS-6, in an area of soil staining and drum storage observed during the site visit, and in subsurface soil at SB-4, located just downgradient of a former underground storage tank (UST) area. PAHs, common constituents of TPH, were not detected above risk-based concentrations at either of these locations.

Organotins in soil

Because butyltin cation concentrations were presented in the XPA report, the concentrations of each cation type were multiplied by a compound specific factor and added to the others to determine the total organotin concentration to allow comparison to the EPA sediment data. This factor was calculated as the ratio of the molecular weight of the organotin compound corresponding to each cation species to the molecular weight of the cation. In this analysis chlorine was assumed to be the anion for calculating the molecular weight of the organotin. The following dimensionless factors were multiplied by each cation concentration to determine the organotin concentration.

tetra-n-butyltin -- 1 tri-n-butyltin -- 1.1 di-n-butyltin -- 1.3 n-butyltin) – 1.6

The organotin concentrations for each cation were then added to arrive at the total organotin concentration for the sample.

Organotins were detected in each of the subsurface soil and five surface soil samples analyzed at adjusted concentrations ranging from 1.08 ppb (SS-7) to 204.1 ppb (SS-9). These concentrations are all below the Portland Harbor Baseline concentration of 300 ppb. SS-9 is located near the shoreline at the north end of the site and could be susceptible to transport via overland runoff into the Willamette River. As discussed below, organotins were detected in each of the sediment samples, including at SD-2S (24.7 ppb), located offshore near SS-9.

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Groundwater

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Exceedences of tapwater PRGs in groundwater samples included one VOC and several PAHs in one well, and four metals in a number of wells. The VOC chloroform was detected in one sample at a concentration of 0.75 ppb; its PRG for tapwater is 0.16 ppb. The PAHs benzo(a)pyrene, chrysene, and indeno(1,2,3-cd)pyrene all were detected above their respective PRGs in sample GW-4, located downgradient of the UST area. The benzo(a)pyrene concentration of 13 ppb was the highest relative concentration, at several orders of magnitude greater than its PRG of 0.0092 ppb. on the confidence of the

Arsenic and iron exceeded their respective tapwater PRGs in all five groundwater samples analyzed. Antimony exceeded its PRG in the two samples where it was detected. Manganese exceeded its PRG in three of five samples analyzed. All of the reported arsenic and manganese concentrations were above their respective AWQC for fish consumption. Lead exceeded its PRG in three of five samples, including GW-5, in which most of the highest metal concentrations were reported. GW-5 is located near a dock generally downgradient of the UST area along a fuel piping line.

A number of compounds were detected below PRGs in groundwater. To evaluate possible impacts to surface water in the Willamette River from discharge of contaminated groundwater, contaminant concentrations detected in direct-push groundwater samples advanced near the shoreline (i.e., GW-5, GW-6, and GW-7) were compared to AWQC and SLVs (Table 3). A number of metals, including chromium, copper, iron, lead, manganese and zinc exceed both screening criteria. It should be noted that the groundwater samples were unfiltered and collected from temporary well points, which can result in higher suspended solids (and metal concentrations) compared with natural groundwater.

Surface Water

Analytical detections in the two surface water samples were limited to metals. No VOCs or SVOCs were detected. Barium was the only metal detected above the PRG. All of the other metals were detected at concentrations below both PRGs and AWQC.

Sediment

A number of SVOCs and metals were present in sediment above DEQ screening levels. In particular, sample SD-5D, the deeper sample collected from about 70 to 90 cm below the top of sediment, contained elevated concentrations of a number of compounds. All subsurface sediment samples in the vicinity of the site (EPA sample SD-055C, SD-4D, SD-5D) have PAHs elevated well above SLVs, with SD-055C and SD-5D levels also well above the Portland Harbor Baseline levels (Table 4). A number of detection limits for SVOCs are well above screening levels. Where detection limits exceed SLVs the associated compounds could be present at levels of concern. The elevated detection limits likely resulted from analytical interference from relatively high PAH or TPH concentrations in the sediment.

For all XPA sediment samples PAHs appear to be the most highly elevated compounds with respect to screening concentrations. Each sediment sample collected contained low molecular weight PAHs (LPAHs) and high molecular weight PAH (HPAH) concentrations above their respective SLVs, with the higher concentrations in the subsurface samples.

PAH concentrations in SD-5D are the most elevated, with those in SD-055C also elevated but somewhat lower. Samples SD-4D (further offshore) and SD-6D (upstream) are significantly lower than in SD-5D, suggesting the Hendren tow boat dock may be a contaminant source. SD-055C is downgradient at approximately the same distance offshore as SD-5D, further suggesting the dock area as a contaminant source for the PAHs, and possibly other SVOCs that were not detected at elevated detection limits. PAHs in surface sediment samples SD-2 and SD-3, located in the vicinity of SD-055C are substantially lower than in that sample. Therefore it appears the contamination is historic is nature. Dibenzofuran at 1,500 ppb in SD-5D was the highest concentration in any of the XPA samples. This concentration is above the Portland Harbor Baseline level but is below the SLV.

Arsenic, copper, lead and zinc occur at concentrations above their respective SLVs in a number of samples. PCBs occurred above the SLV of 34 ppb in SD-5D (76 ppb).

TPH in Sediment

Both TPH –D and TPH-Oil were detected in six of the nine sediment samples analyzed. In general, TPH-Oil was detected at relatively higher concentrations than TPH-D. The highest TPH concentrations were reported for SD-5D, which also contained relatively high levels of PAHs as discussed above.

TPH-Oil concentrations ranged from 410 ppm (SD-4S) to 2,300 ppm (SD-5D). TPH-Oil was not detected at SD-2, SD-3 or SD-6 sample stations.

TPH-D concentrations ranged from 92 ppm (SD-1) to 2,300 ppm (SD-5D). TPH-D was not detected at SD-2 or SD-6 sample stations.

Organotins in Sediment

Total organotins in sediment were calculated as described under the *Organotins in Soil* section above. Organotins were detected in eight of nine sediment samples analyzed at concentrations

ranging from 1.3 ppb (SD-5D) to 158.2 ppb (SD-3S). These concentrations are all below the Portland Harbor Baseline concentration of 300 ppb. SD-3S is located near a dock along the east central portion of the site. Ship mooring areas and dry dock areas are typical source areas for organotins. Higher organotin concentrations could be present in sediment closer to the central dock area.

Summary of Areas of Concern

Based on the results of the XPA, the following appear to be of environmental concern:

Sediment in the SD-5 area

SD-5D has the highest contaminant concentrations of all sediment samples collected in the vicinity of the site, with a similar contaminant distribution as nearby EPA sample SD-055C. PAH concentrations exceed SLVs by a several orders of magnitude. There are no available Probable Effects Level (PEL) available for LPAHs or HPAHs, but McDonald and others have published a PEL for total PAHs of 22,800 ppb. The total PAH concentrations in SD-5D is several orders or magnitude above the PEL, thereby indicating a contaminant "hotspot" in sediment.

Surface soil at the site, particularly near the Willamette River Shoreline at SS-9 and SS-11.

Elevated PAH concentrations in surface soil could potentially reach the Willamette River through overland runoff.

The UST area

5" N 33. THE W.

Two former diesel USTs (20,000 gallon, 10,000 gallon) and a gasoline UST (5,000 gallon) were removed from the site in 1987. The UST Program file (LUST #26-88-0046) has been archived and was not available for review. Contaminated soil was removed to a depth of 26 feet. A residual TPH concentration of 150 ppm in soil was reported. Groundwater reportedly was not encountered in the excavation, although site groundwater appears to be about 16 feet below ground surface (bgs). At the time of the decommissioning there were no numeric cleanup standards, but instead an interim standard of "no visual signs of contamination and no detectable odor" was in effect. A number of PAHs were detected above their respective PRGs in sample GW-4, located just eat (downgradient) of the UST area.

The drum storage area near Blackcat Studios

Elevated TPH concentrations in surface soil at a drum storage area.

The SS-7 area

Although moderate TPH concentrations were detected (TPH-D -62 ppm; TPH-Oil -380 ppm), elevated PAH concentrations (HPAH -9,110 ppb; LPAH -1,206 ppb) in this sample are of concern due to the potential impact to the surface water seep in the vicinity.

Groundwater in the GW-5 Area NEW SERVICE SERVICE SERVICES

This sample was collected near the dock adjacent to a former fuel piping line. It is not known if the piping was removed during the UST decommissioning. Significantly elevated metal concentrations with respect to screening levels and other groundwater samples were detected in this sample. The source of the metals is unclear, although the elevated lead level may be associated with leaded fuel possibly contained in the former gasoline UST. on the state of th

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DEQ Time-Critical Removal Action

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Based on observations of uncontrolled potential hazardous waste at the site, DEQ directed its contractor Foss Environmental to perform a time-critical removal action in May 2001. Foss conducted waste determinations on a number of drums located primarily in three drum storage areas at the site. A total of about 2 (55-gallon) drums of non-hazardous waste, 5 drums of oily water, five drums of characteristic hazardous waste, and 1 cubic yard of paint-related waste (paints, tars and varnishes used in ship maintenance) was removed from the site. and the state of t

In addition, about 5 gallons of PCB-containing oil (1,870 ppm PCBs) and water were drained from a number of PCB capacitors and disposed off-site. Waste determination analysis showed some of the liquid contained barium, methyl ethyl ketone, xylenes, benzene and lead at elevated levels. Fifteen lead-acid batteries also were removed from the site.

Site Hydrogeology Agricultural and the first section of the section o

The site lies in the northern-most Portland Basin, a major north-southeast trending sediment filled structural depression found in the northern part of the Willamette River valley and adjoining Columbia River valley (Swanson et al, 1993). The basin is filled with recent alluvium, Pleistocene cataclysmic flood deposits, Miocene to Holocene non-marine sedimentary rocks, and is underlain by Eocene to Miocene volcanic and sedimentary rocks that are exposed along the basin margins.

The youngest deposits are recent alluvium (silt, sand and gravel mixtures) characteristic of an active fluvial environment. These are made up of shoreline, river channel, and adjacent floodplain deposits.

The Marine Finance facility lies between U.S. Highway 30 (St. Helens Road) and the Willamette River, at the base of the Portland Hills. The facility was constructed on about 18 to 23 feet of predominantly sand fill. The inferred contact between fill and native material is a layer of wood fragments thought to represent the former land surface. Groundwater at the site was encountered at about 16 feet bgs, and likely flows east to northeast towards the Willamette River. In general the native deposits are alluvial and consist of silt, sand and gravel mixtures, and result in unconfined and localized aquifers due to heterogeneity of the deposits. Occurring at various depths in the site vicinity, Columbia River Basalts (CRB) underlie these alluvial deposits. Deep wells installed in fractured CRB can be very productive and important supply wells.

Pathways of Concern

The Marine Finance facility lies in an area of mixed industrial, commercial, and residential use. Approximately 22 residences lie within 1/4 mile of the facility. The residences are located on the west side of St. Helens Road approximately 50 to 200 feet higher in elevation than the site, so surface or subsurface contaminant migration from the site to the residences is unlikely.

A perimeter fence limits public site access. Most of the site is covered with a gravel and little, if any vegetation. Trespassers and site workers could potentially be exposed to surface and/or subsurface contaminants, particularly PAHs, through direct contact, inhalation, or incidental ingestion. Because there are no risk-based concentrations for TPH the significant of the TPH concentration cannot be determined without a site-specific risk assessment.

Elevated TPH and associated compounds such as PAHs and carbazole have been detected at elevated concentrations in sediment at levels that present a significant risk to ecological receptors. Site storm water runoff from known contaminated soil areas is a major pathway of concern. Discharge of PAH and/or metal-contaminated impacted shallow groundwater also is of concern.

Oregon Water Resources Department has well logs for one domestic well within one mile of the Marine Finance facility. The well appears to be approximately one-quarter mile from the site and is not likely affected by the contaminants at the Marine Finance facility. The nearest significant wetlands are located approximately 3 miles downstream at the mouth of the Multnomah Channel. Forest Park lies within 0.5 miles of the site.

Both recreational and subsistence fishing occur within the Lower Willamette River. Commercial fishing within the Portland Harbor is limited to a small Pacific lamprey fishery. Recreational boating, water skiing, swimming, and beach use also occur within the Harbor.

The Lower Willamette River provides habitat for 39 fish species, including populations of wild cutthroat trout, rainbow trout, and mountain whitefish. White sturgeon are plentiful within the Harbor. The Harbor is also an important migratory corridor, nursery habitat, and adult foraging area for two runs of chinook salmon, two runs of steelhead trout, and individual runs of Coho and sockeye salmon.

Upper Willamette River populations of Chinook salmon and steelhead, which migrate through the Harbor, are listed as threatened species under the Federal Endangered Species Act. The Pacific lamprey is considered a federal species of concern.

Great blue herons, cormorants, osprey, mergansers, kingfishers, peregrine falcons, and bald eagles routinely forage within the Harbor. The area is also part of the wintering range for the Aleutian Canada goose. All are protected under the Migratory Bird Treaty Act. The peregrine falcon is federally listed as an endangered species, while the Aleutian Canada goose is federally listed as threatened species. The bald eagle also is a threatened species, but was recently proposed to be removed from this list.

There is little data on the nature and extent of the benthic community within Portland Harbor sediments. However, it is known that contamination in the benthos, which is a protected beneficial use, can be the source of food-chain effects that radiate up to the species listed above, including humans.

The Lower Willamette River between its mouth and Willamette Falls, is water quality limited for mercury in fish tissue, and for pentachlorophenol in fish tissue and sediments in the vicinity of the McCormick and Baxter Superfund site. DEQ's Water Quality Division is developing Total Maximum Daily Load requirements (TMDLs) within the lower Willamette River for these contaminants. A TMDL for 2,3,7,8-TCDD (dioxin) was established in 1991.

Conclusions/Recommendations

The following conclusions are based upon the review of information contained in the XPA and summarized in this Strategy Recommendation Memorandum.

- TPH contamination is relatively widespread at the site and attributable to a number of sources, including drum storage areas and the UST area.
- The drums in the storage areas were removed in a time-critical removal action, thereby eliminating ongoing sources of contamination, although residual contamination may pose an environmental threat.
- PAHs have been detected above PRGs for industrial use soil in three separate areas of the site. Overland runoff of contaminated soil appears to be a pathway of concern.
- PAHs, primary constituents of TPH, have been detected at highly elevated levels at subsurface sediment sample location SD-5D, and at a lower level but still relatively high concentration in the EPA subsurface sediment sample station SD-055C, located downstream of SD-5D. Because PAH concentrations appear to increase with proximity to the site, and the presence of known PAH sources at the site, it appears that the site has contributed significant contamination to sediment in the Willamette River. Furthermore, contaminant concentrations in the upstream and downstream sediment samples are generally lower than in the samples collected adjacent to the Marine Finance site. This indicates that activities at or near the Marine Finance site may be a source for the contamination observed in sediments near the site. Because the site investigation did not discover obvious significant contamination source areas at the site, it does not appear that the uplands portion of the site is a significant contamination source to the Willamette River.
- The historical use of the site's docks, possibly for conveyance of materials and boat fueling, construction, and maintenance, could be a primary source of sediment contamination by routine or accidental discharges.
- Shallow groundwater at GW-5 near the shore of the Willamette River contains a number of metals that exceed screening criteria and are significantly higher than other areas of the site.
- Because there are no risk-based screening levels for TPH or organotins in soil or sediment, a screening level risk assessment cannot be performed to assess the potential risk these contaminants pose. To properly evaluate the risk from these contaminants will require a site specific risk assessment.

Contamination of river sediments adjacent to the Marine Finance site appears to represent a significant threat to human health and aquatic life within the river. Based on the available uplands data there does not appear to be evidence of major widespread contamination in soil or groundwater that could result in the relatively high contaminant levels detected in the sediments. Further uplands investigation should be conducted to corroborate this finding and assess the potential for ongoing releases to the Willamette River. DEQ has determined that the uplands area is a medium priority for additional work. A scope for additional upland work should include:

• Collection of additional surface soil samples at approximately 10 locations to better define the lateral extent of known surface soil contamination.

• Soil sampling from at least two discrete depth intervals at locations with the highest contaminant levels in surface soil (SS-2, SS-7, SS-9) and from the former UST location.

Description of the property of

• Installation and quarterly monitoring (one year minimum) of approximately 6 monitoring wells across the eastern side of the property to assess shallow groundwater contaminants potentially discharging to the Willamette River.

Because there is significant sediment contamination adjacent to the site, the site will be referred to EPA to address in-water issues during the proposed harbor-wide remedial investigation (RI).

There is sufficient information to propose adding the site to DEQ's Confirmed Release List (CRL). There is insufficient information to add the site to the Inventory of hazardous substance sites.

References

DEQ consulted the following references in preparing this Strategy Recommendation:

- 1. Jacobs Engineering (2000), Expanded Preliminary Assessment Data Report (Revised Final), November, 2000.
- 2. Portland Harbor Sediment Investigation Report, prepared by Roy F. Weston, Inc. for USEPA, May 1998.

Attachments

- Table 1. River Sediment Concentrations (EPA 1997)
- Table 2. Summary of Screening Level Exceedences Marine Finance XPA
- Table 3. Comparison of GW-5 and GW-6 Groundwater Concentrations to AWQC
- Table 4. River Sediment Contaminant Concentrations Near Marine Finance.
- Figure 1. Site Location Map
- Figure 2. EPA Sediment Sampling Stations (1997)
- Figure 3. Sample Location Map

Table 1. River Sediment Contaminant Concentrations (EPA, 1997)
Marine Finance Corp.

		·				
		,		_		Apparent
						Portland Harbor
Sample Location:		Down-	Marine	Up-	Up-	Sediment
		Stream	Finance	Stream	Stream	Baseline
Contaminant	Units	SD055	SD055-C	SD057	SD057-C	Maximum Value
Alumainum	+	16600	25000	27500	05.400	40000
Antimony	ppm	<4	35000 NA	37500	35400	42800
Antimony	ррт	<4	11	<5 -5	NA	<5
Arsenic Barium	ppm	111	<8 400	<5 474	<4	<5
	ppm	0.39	180	171	175	195
Beryllium Codmium	ppm	 	0.6	0.63	0.62	0.7
Cadmium	ppm	0.2	0.6	0.3	0.3	0.6
Chromium	ppm	18.6	36.6	35.2	33.9	41
Cobalt	ppm	12.9	18.8	17.7	16.6	19.7
Copper	ppm	18.8	64	37.8	36.8	60
Iron	ppm	29800	42100	39900	38900	45000
Lead	ppm	9	31	9	16	30
Manganese	ppm	356	607	619	524	810
Mercury	ppm	0.02	0.13	0.04	0.15	0.1
Nickel	ppm	17.3	33	28	28.1	32
Selenium	ppm	9	<8	14	11	15
Silver	ppm	0.7	1.3	0.9	1.1	1.4
Thallium	ppm	<4	<8	<5 ₁₉	. 7	13
Titanium	ppm	1520	1790	1910	1870	2075
Vanadium	ppm	71.9	100	100	96.3	112
Zinc	ppm	67.3	178	89.6	91.3	118
2-Methylnaphthalene	ррь	<19	1400	45	60	150
4-Methylphenol	ppb	<19	<190	<19	85	680
Benzoic Acid	ррь	<190	<1900	<190	240	<200
Benzyl Alcohol	ppb	<19	<190	<19	<20	<20
bis(2-Ethylhexyl)phthalate	ppb	<73	<190	<120	<31	390
Butylbenzylphthalate	ррь	<19	<190	<19	<20	<20
Carbazole	ppb	31	370	210	34	100
Di-N-Butylphthalate	ppb	<19	<190	<19	<20	<20
Di-N-Octylphthalate	ppb	<19	<190	<19	<20	<20
Dibenzofuran	ppb	<19	1300	52	32	100
Dimethylphthalate	ppb	<19	<190	<19	<20	<20
Pentachlorophenol	ррь	<97	<970	<96	<99	Detect
Phenol	ррь	<19	<190	<19	<20	<20
LPAHs (total)	ppb	212	69410	932	3447	700
HPAHs (total)	ррь	1750	136300	2085	18950	2400
DDTs (total)	ррь	6.5	94	11	5	220
PCBs (total)	ррь	<39	<350	<38	<40	<180
Organotins (total)	ррь	<30	85	43	<30	300
2,4-D	ррь	NA	NA	NA	NA	<3.3
2,4-DB	ppb	NA	NA	NA	NA	<5
TOC	%	1	2.2	1.2	1.2	2
					-:-	
Water Depth	Ft	23	23	13	13	
Sediment Sample Depth	cm	0-10	0-90	0-10	0-90	
		0.10		U-10	0-30	

Table 2.Summary of Screening	Level Exceedences - Marine Finance XPA

	`	,	1	Thanco Al A
Media	Detections/ #samples	Concentration range	Screening Concentration	Exceedence Location
Surface Soil [6")			PRG-Ind. Soil	
Benzo(a)pyrene	3/10	790-910 ppb	290 ppb	SS-2; SS-7; SS-9
Arsenic	11/11	0.9-13.3 ppm	2.7 ppm	all except SS-8
Chromium	11/11	8.2-81.3 ppm	64 ppm (CrVI)	SS-5
Subsurface Soil			PRG-Ind Soil	50 0
Arsenic	3/3	3.1-3.3 ppm	2.7 ppm	SB-1; SB-2; SB-5
Groundwater	0,0	ол ото ррш	PRG-Tapwater	
Chloroform	1/7	0.75 ppb	0.16 ppb	6)4/.6
Benzo(a)pyrene	1/7	13 ppb		GW-2
Chrysene	1/7	9.9 ppb	0.0092 ppb	GW-4
Indeno(1,2,3-cd)pyrene	1/7		9.2 ppb	GW-4
		11 ppb	0.092 ppb	GW-4
Antimony	2/5	25.6-34.8	15 ppb	GW-1; GW-5
Arsenic	5/5	3.7-36.9 ppb	0.045 ppb	all locations
Iron	5/5	29,700-89,300 ppb	11,000 ppb	all locations
Lead	5/5	11.6-117 ppb	15 ppb**	GW-1,GW-5,GW-6
Manganese	5/5	773-3,160 ppb	880 ppb	GW-5; GW-6;GW-7
Surface Water			SLV/AWQC	
Barium	2/2	5.2-19.4 ppb	4 ppb/1,000 ppb	Both SW locations
Sediment			SLV/PDX Har.	
				All exceed the SLV;
				SD-4S; SD-4D; SD-
				5S; and SD-5D
				exceed both the
				SLV and PDX
			}	Harbor Baseline
LPAH	9/9	123-156,720 ppb	76/700 ppb	values.
	0,0	120 100,120 ppb	70/700 ррб	All exceed the SLV:
			·	SD-4S; SD-4D; SD-
	1			5S; and SD-5D
				l '
				exceed both the
		·		SLV and PDX
HPAH	0.40	4 000 407 000		Harbor Baseline
ПРАП	9/9	1,008-427,800 ppb	193/2,400 ppb	value.
				None exceed SLVs;
				SD-5D exceeds
				PDX Harbor
2-Methylnaphthalene	9/9	2-920 ppb	NAV150 ppb	Baseline
				None exceed SLVs;
*				SD-5D exceeds
				PDX Harbor
Dibenzofuran	9/9	2-1,500 ppb	5,100/100 ppb	Baseline
Butylbenzylphthalate	4/9	4-100 ppb	NA/<20 ppb	SD-5D
Arsenic	9/9	3.6-11.1 ppm	6/<5 ppm	SD-3S; SD-5S
				SD-3S; SD-4S; SD-
		İ		5D; and SD-6S
			ŀ	exceed the SLV;
				SD-3S exceeds
				both the SLV and
				PDX Harbor
Copper	9/9	26.3-98.5 ppm	36/60 ppm	Baseline
			облов ррии	Dascinio
				SD-1; SD-5S and
			ļ	SD-5D exceed both
			ļ	the SLV and PDX
Lead	9/9	10.9-232 ppm	35/30 ppm	Harbor Baseline
	5,5	10.0-202 ppin	20120 hhiii	
		Ì	1	None exceed the
			ļ	SLV; SD-5S; SD-
				5D; and SD-6D
				exceed the PDX
Mercury	9/9	0.02-0.18 ppm	0.2/0.1 ppm	Harbor Baseline
				SD-1, SD-3S and
				SD-5S exceed
				SLVs;SD-4S and
				SD-5D exceed the
,				PDX Harbor
Zinc	9/9	65.1-273 ppm	123/118 ppm	Baseline

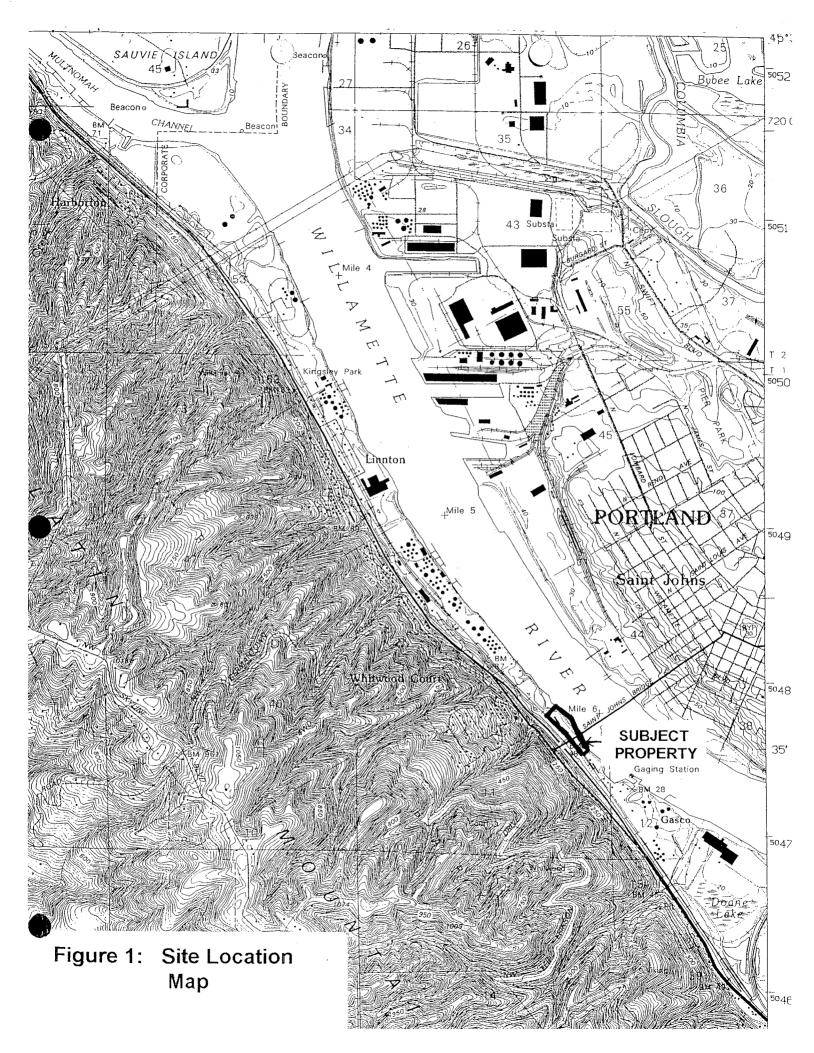
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Table 4. River Sedin	nent C	nntaminan	t Concentr	ations Noa	r Marina Fi	nanco			
	Location	SD-055C	SD-4D	SD-5D	SD-6D	DEQ SLV	Portland Harbor Baseline Value		
Contaminant	Units								
Aluminum	ppm	35,000	NA	NA	NA	NA	42800		
Antimony	ppm	NA	0.19	0.56	0.16	3	<5		-
Arsenic	ppm	<8	3.8	3.6	3.7	6	<5 <5		
Barium	ppm	180	NA NA	NA	NA NA	NA NA	195		7
Beryllium	ppm	0.6	0.43	0.41	0.45	NA NA	0.7		
Cadmium	ppm	9 0.6	0.17	0.43	0.15	0.6	0.6		
Chromium	ррт	36.6	24.3	23,1	22.9	37	41		
Cobalt	ppm	18.8	NA	NA .	NA NA	NA NA	19.7		
Copper	ppm	64	26.3	36.5	29.4	36	60		
Iron	ppm	42,100	NA	NA	NA NA	NA NA	45000		
Lead	ррт	31	10.9	46	15.1	35	30		
Manganese	ррт	607	NA	NA	NA NA	1,100	810		
Mercury	ppm	0.13	0.07	0.18	0.14	0.2	0.1		
Nickel	ppm	33	22.8	25.1	20.5	18	32	,	
Selenium	ppm	<8	<2.2	<2.2	<2.21	NA	15		
Silver	ррт	1.3	0.22	0.49	0.25	4.5	1.4		
Thallium	ррт	<8	0.09	0.07	0.06	NA NA	13		
Titanium	ррт	1,790	NA NA	NA	NA NA	NA NA	2075		
Vanadium	ppm	100	NA	NA NA	NA NA	NA NA	112		
Zinc	ppm	178	78.8	121	65.1	123	118	-,41	+
2-Methylnaphthalene	pph	1,400	17	920	3	NA NA	150	· · · · ·	
4-Methylphenoi	ррь	<190	<290	<12,000	<300	NA NA	680		
Benzoic Acid	ppb	<1,900	50	<24,000	50	NA ·	<200		ļ
Benzyl Alcohol	ppb	<190	<73	<3,000 %	<74	NA NA	<20		
bis(2-Ethylhexyl)phthalate	ppb	<190	20	200	<3000	750	390		
Butylbenzylphthalate	ppb	<190	<29	100	<30	NA .	<20		
Carbazole	ррь	370	30	730	1	140	100	-	-
Di-N-Butylphthalate	ppb	<190	<29	<1,200	<30	NA NA	<20		-
Di-N-Octylphthalate	ppb	<190	<290	NA	<300	NA NA	<20	j	ļ
Dibenzofuran	ppb	1,300	21	1,500	2	5,100	100		+
Dimethylphthalate	ppb	<190	0.5	<590	<15	NA	<20		
Pentachlorophenol	ррь	<970	<440	<18,000	<440	NA NA	Detect		
Phenol	ppb	<190	9	<3,000	6	48		·	ļ
LPAHs (total)	ррь	69,410	3,326	156,720	123	76	<20 700		
HPAHs (total)	ppb	136,300	16,378	427,800	1,580	193		·	
DDTs (total)	ppb	64	NA	+21,000 NA	1,560 NA	7	2400 220		
PCBs (total)	ppb	<350	10	76	<20	34	<180		
Organotins (total)	ррь	45	7.8	1	<1	NA	300		
2,4-D	ррь	NA	NA	NA NA	NA NA	NA NA	<3.3		
2,4-DB	ррь	NA NA	NA NA	NA NA	NA NA	NA NA	<5		
тос	βρυ %	2.2	0.92	4.37	1.34	NA NA	2		
							_		
Water Depth	Ft	35	30	25	43				
Sediment Sample Depth	cm	0-90	80-90	70-90	70-90				:
	Notes:	-							
	100	=	Exceeds DI	EQ SLV					
	100	=	Exceeds Po	ortland Hark	oor Baseline				
	NA		Not and	d or not -: :	labla		ļ	, ———	ļ
L	IVA	=	INOL analyze	d or not avai	iabie				

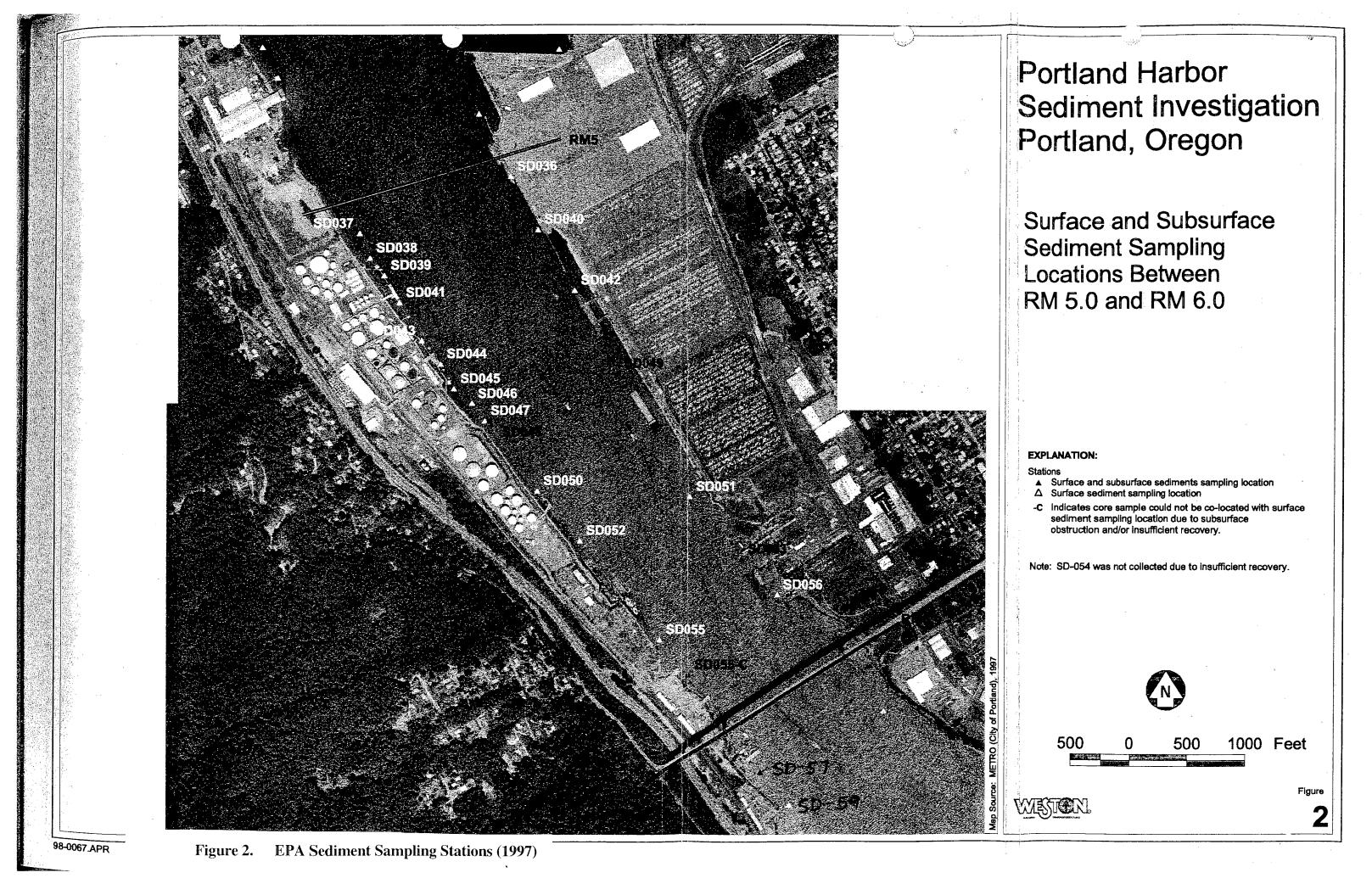
Table 3. Comparison	of GV	V-5, GW-6	and GW-7	Groundwa	ter Conce	ntrations	to Surfa	ce Water	Screening	Criteria
Sample Location		GW-5	GW-6	GW-7	AWQC ¹ (Fresh Chronic)	SLV ²				
Contaminant	Units		<u> </u>			<u> </u>				
Aluminum	ρpb	13,300	10,400	9,840	NA	87		,		
Antimony	ppb	25.6	ND	ND	NA	1,600				
Arsenic	ppb	36.9	3.7	5.2	150	150				
Barium	ppb	182	179	103	NA	4				
Beryllium	ррь	0.2	0.9	ND	NA	5.3				
Chromium	ppb	22.5	vice ₹15:6, # \$	\$ a 29.4	11*	11*				
Cobalt	ppb	14.7	16.6	9.2	NA	23				
Copper	ppb	4,95,42	7 24.6 5	20.1	9	9				-
Lead	ррь	117	25.6	11.6	2.5	2.5				
Manganese	ррь	3,160	1,500	1,630	NA	120				
Nickel	ppb	19.3	21.3	26.2	. 52	52				
Vanadium	ррь	56	53.3	44.8	NA	20				
Zinc	ppb	227	99.9	63.3	120	120				
Fluoranthene	ppb	13	ND	ND	NA	6.16				
Pyrene	ррь	14	ND	ND	NA	NA				
	Notes:		,				4			
	100	=	Exceeds Di	EQ SLV						
						<u> </u>				
	100	=	Exceeds AV	VQC (fresh	chronic crit	eria)				
	¹ EPA A	L Ambient Wat	er Quality Cr	iteria						<u></u>
				el Value (SL\	/) for freshw	ater				
			ent chromium		, .51 1100114					

Table 1. River Sediment Contaminant Concentrations (EPA, 1997)

Marine Finance Corp

	1	ince Corp				
Sample Location:		Down- Stream	Marine Finance	Up- Stream	Up- Stream	Apparent Portland Harbor Sediment Baseline
Contaminant	Units	SD055	SD055-C	SD057	SD057-C	Maximum Value
	\bot					
Aluminum	ppm	16600	35000	37500	35400	. 42800
Antimony	ppm	<4	NA .	<5	NA	<5
Arsenic	ppm	<4	<8	<5	<4	<5
Barium	ppm	111	180	171	175	195
Beryllium	ppm	0.39	0.6	0.63	0.62	0.7
Cadmium	ppm	0.2	0.6	0.3	0.3	0.6
Chromium	ppm	18.6	36.6	35.2	33.9	41
Cobalt	ppm	12.9	18.8	17.7	16.6	19.7
Copper	ppm	18.8	64	37.8	36.8	60
Iron	ppm	29800	42100	39900	38900	45000
Lead	ppm	9	31	9	16	30
Manganese	ppm	356	607	619	524	810
Mercury	ppm	0.02	0.13	0.04	0.15	0.1
Nickel	ppm	17.3	33	28	28.1	32
Selenium	ppm	9	<8	14	11	15
Silver	ppm	0.7	1.3	0.9	1.1	1.4
Thallium	ppm	<4	<8	<5	7	13
Titanium	ppm	1520	1790	1910	1870	2075
Vanadium	ppm	71.9	100	100	96.3	112
Zinc	ppm	67.3	178	89.6	91.3	H
2-Methylnaphthalene	ppb	<19	1400	45	60	118
4-Methylphenol	ppb	<19	<190	<19	85	150 680
Benzoic Acid	ppb	<190	<1900	<190	240	
Benzyl Alcohol		<19	<1900	 		<200
bis(2-Ethylhexyl)phthalate	ppb	<73	· -	<19	<20	<20
Butylbenzylphthalate	ppb	<19	<190	<120	<31	390
Carbazole	ppb	31	<190 370	<19	<20	<20
	ppb		 	210	34	100
Di-N-Butylphthalate	ppb	<19	<190	<19	<20	<20
Di-N-Octylphthalate	ppb	<19	<190	<19	<20	<20
Dibenzofuran	ppb	<19	1300	52	32	100
Dimethylphthalate	ppb	<19	<190	<19	<20	<20
Pentachlorophenol	ppb	<97	<970	<96	<99	Detect
Phenol	ppb	<19	<190	<19	<20	<20
LPAHs (total)	ppb	212	69410	932	3447	700
HPAHs (total)	ppb	1750	136300	2085	18950	2400
DDTs (total)	ppb	6.5	94	11	5	220
PCBs (total)	ppb	<39	<350	<38	<40	<180
Organotins (total)	ppb	<30	85	43	<30	300
2,4-D	ppb	NA	NA	NA	NA	<3.3
2,4-DB	ppb	NA	NA	NA	NA	<5
TOC	%	1	2.2	1.2	1.2	2
Water Depth	Ft Ft	23	22	10	10	
Sediment Sample Depth	cm cm	23 0-10	0-90	13 0-10	13 0-90	





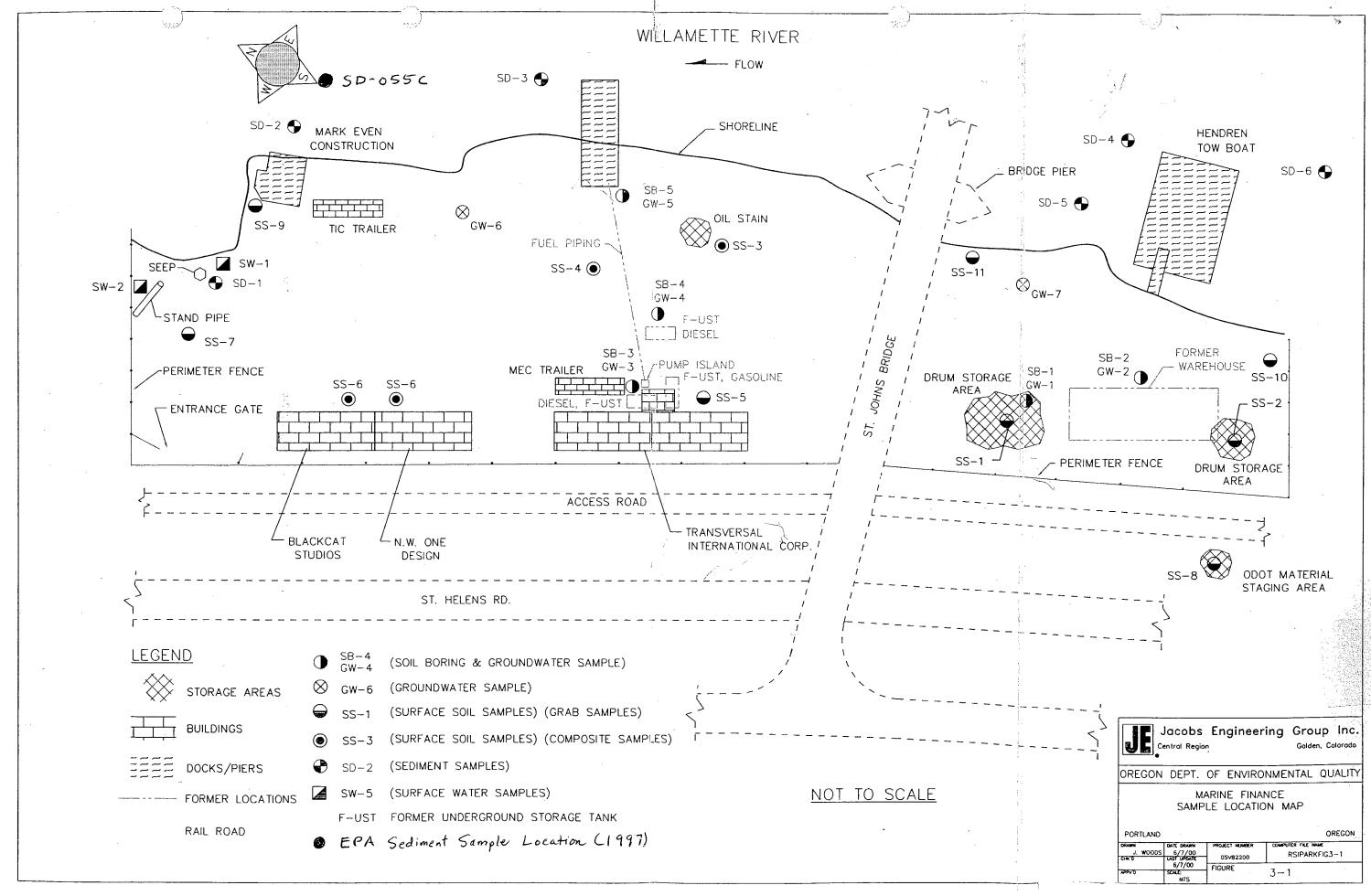


Figure 3. Sample Location Map



Department of Environmental Quality

811 SW Sixth Avenue Portland, OR 97204-1390 503-229-5696 TTY 503-229-6993

March 13, 2003

Floyd Hendren Hendren Tow Boat Co. 12751 NW Springville Road Portland, Oregon 97229

CERTIFIED MAIL NO. 7001 2510 0003 4990 3486 RETURN RECEIPT REQUESTED

RE: NOTICE TO CURRENT AND/OR PAST OWNERS AND OPERATORS OF DECISION TO LIST CONTAMINATED PROPERTY ON THE CONFIRMED RELEASE LIST (CRL)

Marine Finance Co.
8444 NW St. Helens Road, Portland
ECSI ID NO. # 2352
Expanded Preliminary Assessment 30-NOV-2000

Dear Mr. Hendren:

By letter dated December 17, 2002 the Department of Environmental Quality (Department) notified you as an owner or operator of the Marine Finance Co. site of the Department's proposal to add this facility to the Confirmed Release List (CRL). The notice invited comments on the proposed listing. None were received.

Marine Finance Co. meets the criteria for listing, and with this notice the Department is adding it to the CRL. Enclosed is the Site Summary Report, which includes the information about the Marine Finance Co. site that will appear on the CRL. If after a site assessment the Department determines that a comprehensive site investigation or cleanup is necessary, Marine Finance Co. will be proposed for the Inventory; a second list of sites with confirmed releases of hazardous substances.

The Department will update the CRL and Inventory quarterly and provide copies to area newspapers and to the public upon request. A facility can be removed from the Confirmed Release List and Inventory after all necessary cleanup is completed.

We are pleased that you have elected to participate in our Voluntary Cleanup Program to investigate and assess necessary remedial actions for this site. We hope that this cooperative relationship will continue until potential threats from hazardous materials at this site have been eliminated.

March 13, 2003 Mr. Hendren Page 2

As noted in the earlier letter to you, listing your property does not necessarily mean that you are responsible for the contamination, investigation or cleanup. Responsibility for these costs is prescribed by various provisions in state and federal laws. If you have specific questions about the CRL or Inventory, or want copies of the statute or regulations governing the Department's site assessment, listing, or cleanup processes, please contact Listing Coordinator Kimberlee Van Patten at (503) 229-5256 or at the address shown on the letterhead.

Sincerely,

Charles W. Donaldson

Manager

Emergency Response and Site Assessment

Enclosures:

Site Summary Report

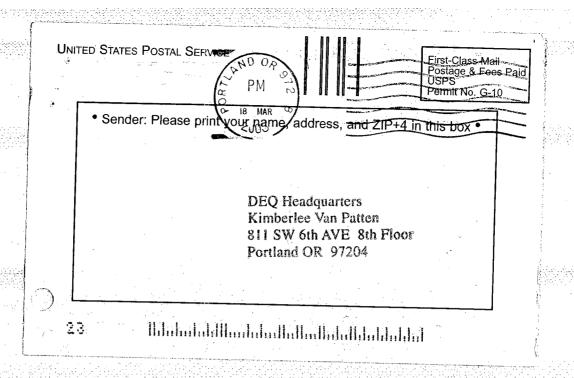
CC:

Rod Struck; NWR, DEQ

ECSI File # 2352

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 Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired. Print your name and address on the reverse so that we can return the card to your. Attach this card to the back of the mailpiece or on the front if space permits. 	A. Signature X
1. Article Addressed to: Floyd HENDREN HENDREN TOW BOAT Co.	D. Is delivery address different from item 1?
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- For an additional fee, a Return Receipt may be requested to provide proof of delivery. To obtain Return Receipt service, please complete and attach a Return Receipt (PS Form 3811) to the article and add applicable postage to cover the fee. Endorse mallipiece "Return Receipt Requested". To receive a fee waiver for a duplicate return receipt, a USPS postmark on your Certified Mail receipt is
- For an additional fee, delivery may be restricted to the addressee or addressee's authorized agent. Advise the clerk or mark the mailpiece with the endorsement "Restricted Delivery".
- If a postmark on the Certified Mail receipt is desired, please present the article at the post office for postmarking. If a postmark on the Certified Mail receipt is not needed, detach and affix label with postage and mail.

IMPORTANT: Save this receipt and present it when making an inquiry.

PS Form 3800, January 2001 (Reverse)



Department of Environmental Quality

811 SW Sixth Avenue Portland, OR 97204-1390 (503) 229-5696 TTY (503) 229-6993

December 17, 2002

Floyd Hendren Hendren Tow Boat Co. 12751 NW Springville Road Portland, Oregon 97229

CERTIFIED MAIL NO. 7001 2510 0003 4989 8799 RETURN RECEIPT REQUESTED

RE:

NOTICE TO CURRENT AND/OR PAST OWNERS AND OPERATORS OF PROPOSAL TO ADD CONTAMINATED PROPERTY TO DEQ's CONFIRMED RELEASE LIST (CRL)

Marine Finance Co. 8444 NW St. Helens Road, Portland ECSI ID No. # 2352

Dear Mr. Hendren:

The Oregon Legislature has directed the Department of Environmental Quality (Department) to develop and maintain two lists, the Confirmed Release List (CRL) and Inventory, for the purposes of tracking sites with releases of hazardous substances. The CRL includes all sites where releases of hazardous substances have been confirmed. A release is considered to be "confirmed" when the Department documents a release of a hazardous substance that may pose a significant threat to human health or the environment. The Inventory includes those sites with a confirmed release where the Department has determined that additional investigation or cleanup is necessary. Both the CRL and the Inventory are updated quarterly and made available to the public upon request.

This letter is notification that the Department proposes to include the Marine Finance Co. site at 8444 NW St. Helens Road, Portland on the CRL. Because we understand that the information we possess regarding this site may be outdated or incomplete, you have an opportunity to provide any comments you believe will correct or supplement this listing information. All comments must be received by the Department within forty-five (45) days from your receipt of this notice. If you are unable to respond within the initial 45-day comment period, you may request an extension of forty-five (45) days.

The Department reviews and responds to all comments received on listing proposals.

Listing this property does not necessarily mean that you are responsible for the contamination, investigation or cleanup. Various provisions in state and federal laws prescribe responsibility for these activities. The site can be removed from either the CRL or Inventory after all necessary actions are

December 17, 2002 Mr. Hendren Page 2

taken to ensure protection of human health and the environment. We appreciate any work you may have done to clean up or investigate this site and hope we can continue to work together to eliminate threats to Oregon from hazardous materials.

Comments and requests for extensions should be sent to:

Oregon Department of Environmental Quality Site Assessment Program 811 SW 6th Avenue, 8th Floor Portland, OR 97204

Enclosed, please find several supporting documents that outline current site conditions, explain the listing process, and document how the site meets the listing criteria described in state laws and administrative rules. If you have specific questions about the CRL, Inventory, or site activities, or want copies of the Oregon Environmental Cleanup Law, please contact the Department's listing coordinator Kimberlee Van Patten at (503) 229-5256 or at the address shown above.

Sincerely,

Charles W. Donaldson

Manager

Emergency Response and Site Assessment

Enclosures:

- cc:

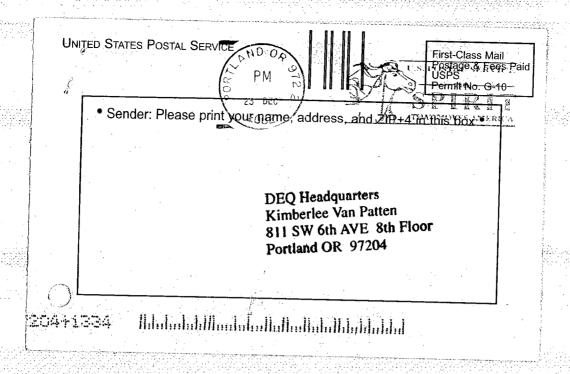
1) Site Summary Report; 2) Fact Sheet; 3) Site-Specific Data Sheet; 4) Oregon Statutes & Rules

Mark Pugh; NWR, DEQ

ECSI File #2352

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PS Form 3800, January 2001 (Reverse)

102595-01-M-1049



Department of Environmental Quality

811 SW Sixth Avenue Portland, OR 97204-1390 (503) 229-5696 TTY (503) 229-6993

December 17, 2002

Mike Williams
Marine Finance Corporation
8444 NW St. Helens Rd.
Portland, Oregon 97231

CERTIFIED MAIL NO. 7001 2510 0003 4989 8805 RETURN RECEIPT REQUESTED

RE: NOTICE TO CURRENT AND/OR PAST OWNERS
AND OPERATORS OF PROPOSAL TO ADD
CONTAMINATED PROPERTY TO DEQ'S
CONFIRMED RELEASE LIST (CRL)

Marine Finance Co. 8444 NW St. Helens Road, Portland ECSI ID No. # 2352

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December 17, 2002 Mr. Williams Page 2

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Site Assessment Program
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Portland, OR 97204

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Sincerely,

Charles W. Donaldson

Manager

Emergency Response and Site Assessment

Enclosures:

1) Site Summary Report; 2) Fact Sheet; 3) Site-Specific Data Sheet; 4) Oregon Statutes & Rules

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Mark Pugh; NWR, DEQ

ECSI File #2352

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Marine Finance Co. 8444 NW St. Helens Road, Portland ECSI ID No. # 2352

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December 17, 2002 Mr. Williams Page 2

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Sincerely,

Charles W. Donaldson

Manager

Emergency Response and Site Assessment

Enclosures:

1) Site Summary Report; 2) Fact Sheet; 3) Site-Specific Data Sheet; 4) Oregon Statutes & Rules

cc:

Mark Pugh; NWR, DEQ

ECSI File #2352

Site-Specific Data Supporting a CRL Listing Proposal by the Oregon Department of Environmental Quality

This document references the facts and judgments that DEQ has relied upon to propose the site shown below for the Confirmed Release List (CRL). This document, with the attached summary of listing statutes/rules and the ECSI site summary report, also shows how the listing proposal satisfies applicable Oregon law and administrative rules. (This document presents only the minimum documentation requirements for CRL listing; more detailed information about the site can be found in the ECSI files in DEQ's regional offices.)

- A. Site name and ECSI #: Marine Finance Co. ECSI #2352
- B. Site address: 8444 NW St. Helens Road, Portland
- C. DEQ is proposing this site for the: Confirmed Release List (CRL)
- D. Date of listing proposal: December 17, 2002
- **E.** DEQ has documented a confirmed release at the site based on laboratory data from on-site sampling, contained in the site file.

Date of on-site sampling or laboratory data report: **Jacobs Engineering XPA Report**, **November 2000.**

On-site media with documented contamination: Soil, groundwater, sediments. Type(s) of contamination documented at the site: Metals, petroleum hydrocarbons, polynuclear aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs).

Is this contamination present above background levels: Yes.

- **F.** DEQ has determined that CRL listing exclusion criteria do not apply to this site because:
 - 1. The release is not of de minimis (insignificant) proportions; and
 - 2. The release is not known to have dissipated; and
 - 3. Neither DEQ nor EPA has authorized the release by permit (or the release was permitted, but has accumulated or migrated); and
 - 4. The released substance is not a registered pesticide product applied appropriately (or it is such a product that has accumulated or migrated); and
 - 5. DEQ is not aware of any remedial action that has eliminated all risks the release may have posed to human health or the environment; and
 - 6. DEQ is unable to conclude that the release requires no further investigation, cleanup, or long-term controls to protect human health or the environment.
- **G.** DEO has completed the required documentation for CRL listing, as follows.
 - 1. <u>Facility address, location, and description</u>: refer to items A and B above for site address and location, and the ECSI site summary report for known information about the facility.
 - 2. <u>How and when the release occurred (if known)</u>: refer to the "Contamination Information" or "Manner and Time of Release" narratives in the ECSI site summary report.
 - 3. <u>Types and quantities of hazardous substances involved</u>: refer to the ECSI site summary report, specifically the "Hazardous Substance/Waste Types" or "Contamination Information" narratives, or the "Substance Contamination" section.

- 4. The nature of facility contamination and status of remedial action (if known): refer to the "Contamination Information," "Media Contamination Comments," "Pathways," or "Status of Investigative or Remedial Action" narratives in the ECSI site summary report.
- 5. Persons who may have owned/operated the facility when the release occurred: Based on information in its files, DEQ has entered this information into the "Parties" section of the ECSI site summary report.



Environmental Cleanup Site Information Site Summary Report

for site #2352 - Marine Finance Co.

General Information

Site ID:

2352

Investigative Status:

Suspect

Name:

Marine Finance Co.

Further Action Priority: High

Aliases/Other Site Names:

Hendren Tow Boat Co.

REH Inc.

Riverside Industrial Park

Address

8444 NW St. Helens RD, Portland, 97231

Cerclis #:

NPL Site:

No

Region:

Northwest Region

Orphan Site: Yes

Study Area: No

County:

Multnomah

Orphan Site Account

Site Location:

Brownfield:

Property

Township/Range/Section: 1.00N, 1.00W, 11

Remedial Action Funding:

Tax Lots 32

Latitude:

45deg. 35' 8.00"(45.5855)

Site Size:

9.7 acres

Longitude: -122deg. 46' 14.00"(-122.7705)

Study Areas

Study Area ID	Study Area	Site Association to Study Area
2339	V.A Designated National Estuaries	Included within the Study Area but not yet suspected
2340	V.A Surface Waters, WQ-Limited for Toxics	Included within the Study Area but not yet suspected
1544	Lower Willamette River Basin Study Area	Included within the Study Area but not yet suspected
2068	Portland Harbor Sediments	Included within the Study Area but not yet suspected

Facilities/Operation

Name:

Marine Finance Company

Comment:

Years Of Operation: October 1993 to present

Operating Status:

Active

SIC Codes:

5090 - MISCELLANEOUS DURABLE GOODS

Permits

Number

Type

UST File

LUST File

Issued By DEQ/UST

11378 Permits

Number 26-88-0046

Type

Issued By

DEQ/UST

Permits

Number ORQ000005892 Type **HW** Generator

Issued By DEQ/RCRA

Comments.

One time disposal

植物状态 人名

1 13 m

Comments

Comments

General Site Description:

Site History:

Contamination:

(11/30/2000 RGS/SRS) The Marine Finance Company (MFC) facility is used for office trailer storage, warehousing, and houseboat construction. The Hendren Tow Boat Company operates a tugboat dock on the Willamette River at the site. In January 1998, the US Coast Guard expressed concern over Hendren's waste-handling practices, noting in a spill report the presence of numerous drums of oily rags, antifreeze and other wastes. In September 1999, DEQ's Site Assessment program recommended an expanded Preliminary Assessment (XPA) at the facility. DEQ began work using a state contractor in January 2000, but MFC requested an opportunity to conduct the XPA themselves. DEQ and MFC signed a voluntary agreement in April 2000, but MFC was unable to meet the terms of the agreement. DEQ declared the site an Orphan project in July 2000 after determining that MFC was "unwilling" to investigate or clean up the site. (10/3/02 MTP/VCP) DEQ declared the site an Orphan project in July 2000 after determining that Marine Finance Corporation was "unwilling" to investigate or clean up the site. DEQ retained Jacobs Engineering to conduct an Expanded Preliminary Assessment (XPA), Jacobs collected soil, groundwater and sediment samples at the site in August 2000, and submitted the XPA report in November 2000. DEQ completed removal of abandoned waste containers, batteries, and drums at the facility in May 2001. The XPA included collecting six groundwater samples, five Willamette River sediment samples, and 13 soil samples. In general, samples were analyzed for metals, total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs; except sediments), semi-volatile organics (SVOCs), total organotins (includes tributyltin (TBT)), and polychlorinated biphenyls (PCBs). In general, the XPA indicates that there is not significant or widespread contamination at the site. TPH as heavy oil or diesel was detected in the majority of soil samples at concentrations up to 9,800 mg/kg and 1,400 mg/kg, respectively. Benzo(a)pyrene was detected in three samples. All three detected concentrations are above EPA Preliminary Remediation Goals 9PRGs) for industrial use soil. Arsenic exceeded the PRG in a majority of samples analyzed, but appears to be within the expected range of naturally occurring concentrations. Chromium exceeded the PRG in one sample. One VOC and several polynuclear aromatic hydrocarbons (PAHs) exceeded the drinking water PRG in one groundwater sample, with several metals exceeding their respective PRGs in a number of samples. However, because water samples were unfiltered these concentrations could be biased high due to suspended sediment in the samples. TPH as heavy oil and diesel was detected in the majority of sediment samples at concentrations up to 2,300 mg/kg and 2,800 mg/kg. PAHs, especially SD-5D, were elevated compared to ecological screening level values (SLVs) as well as Portland Harbor Baseline concentrations. Organotin and PCB concentrations in sediment were relatively low, with only one PCB levels above the SLV. While the XPA did document on-site contamination, it does not appear that significant contaminant sources are present in the upland portion of the site, and the site does not appear to be an ongoing or current source of contamination to the Willamette River. However, due to the limited scope of the XPA, DEQ has identified additional tasks that need to be completed to fully characterize the site and to show that shallow groundwater is not adversely impacting the river. These tasks include: 1) collecting additional surface soil samples at approximately 10 locations to better define the lateral extent of surface soil contamination; 2) sampling soil at two or more discrete depth intervals at locations with the highest contaminant levels in surface soil (SS-2, -7, -9) and from the former UST location; 3) installation and quarterly monitoring (one year minimum) of approximately 6 monitoring wells across the eastern side of the property to assess shallow groundwater contaminants potentially discharging to the Willamette River. Depending on the results of the additional investigation, remedial action may be necessary. Remedial activities may include a soil cap (e.g., maintained gravel or asphaltic concrete if not covered by structures) and a stormwater management system and institutional controls (including a DEQ-approved soil management plan; cap maintenance; a hazard communication plan, land use restrictions; and groundwater use restrictions).

Substances

Medium Soil	Substance Data 0.9-13.3 ppm	Evidence Date Sample Depth Laboratory Data 8/1/00
Groundwater	36:0 ppb	Laboratory Data 8/1/00
Date Released:		
Quantity Releas	ed:	or of the control Millian to the control with a control with the control of the control of the design of the co The control was to the control of the control of the control was to the control of the co
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ubstance Name:	Benzo(a)pyrene	
Medium	Substance Data	Evidence Date Sample Depth
Groundwater	13 ppb	Laboratory Data 8/1/00
Soil	910 ppb	Laboratory Data 8/1/00
Date Released:		
Quantity Releas	sed:	
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Release Commo	the second secon	
Source of Inform	•	
Substance Name:	Carbazole	
Medium	Substance Data	Evidence Date Sample Depth Laboratory Data 6/1/97

Date Released: Quantity Released: **General Comment:** Media Comments: **Release Comments:** Source of Information: Substance Name: Chromium Medium **Substance Data** Sample Depth **Evidence** Date Soil Laboratory Data 81.3 ppm 8/1/00 Date Released: **Quantity Released: General Comment:** Media Comments: **Release Comments:** Source of Information: 1 8710 Substance Name: Chrysene Medium **Substance Data Evidence** Date Sample Depth Groundwater Laboratory Data 9.9 ppb 8/1/00 Date Released: Quantity Released: **General Comment: Media Comments: Release Comments:** Source of Information:

Substance Name: Copper

Medium

Substance Data

Sediment

98.5 ppm

EvidenceLaboratory Data

William State

Date 8/1/00

Sample Depth

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General Comment:					
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Substance Name: Dibenzofuran		, # · ·	·		
Medium Substance Data Sediment 1,300 ppb		Evidence Laboratory Data	Date 6/1/97	Sample Depth	
Sediment 1,500 ppb	* ***	Laboratory Data	8/1/00	A Property of the Control	
Date Released:					
Quantity Released:					
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Substance Name: Indeno(1,2,3-cd)pyrene					
Medium Substance Data	t december to the	Evidence	Date	Sample Depth	
Groundwater 11 ppb		Laboratory Data	8/1/00		
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Sediment 232 ppm	· · · · · · · · · · · · · · · · · · ·	Laboratory Data	8/1/00		

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Source of Info	ormation:				
Substance Name	e: Methylnaphthalene,2-				
Medium	Substance Data	Evidence	Date	Sample Depth	
Sediment	1,400 ppb	Laboratory Data	6/1/97	Commence of the control of the contr	
Sediment :	920 ppb	Laboratory Data	8/1/00	jakanjer "Yeri	
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Substance Name	e: Polyaromatic hydrocarbons (pah)				
Medium	Substance Data	Evidence	Date -	Sample Depth	
Sediment	HPAHs - 136 ppm	Laboratory Data	6/2/98		
Sediment	HPAHs - 427,800 ppb	Laboratory Data	8/1/00		
Sediment	LPAHs - 6156,720 ppb	Laboratory Data	8/1/00	. 14. Sat in the second	
Sediment	LPAHs - 69.4 ppm	Laboratory Data	6/1/97		
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Source of Info	ermation:		a surfacement of the second	1885 - 1715 A	A Sweet with the company
Substance Name	e: Zinc				
Medium	Substance Data	Evidence	Date	Sample Depth	
Sediment	273 ppm	Laboratory Data	8/1/00		

Date Released:

Quantity Released:

General Comment:

Media Comments:

Release Comments:

Source of Information:

Hazardous

Substance/Waste

Types:

ypes:

Media

Contamination:

Pathways & Other

Hazards:

The site is located along Portland Harbor, a stretch of the Willamette River between Sauvie Island and Swan Island that was added to the National Priorities List (NPL) in December 2000. The shores of Portland Harbor have been heavily industrialized for over 100 years, and river sediments are contaminated with a

Petroleum hydrocarbons, polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs),

variety of substances.

and metals.

Health Threats:

Investigative, Remedial, and Administrative Actions

Action Site added to database	Start Date 5/25/99 Comment:	Completion Date	Responsible Staff Janelle Waggy	Agency DEQ	Region NWR	Lead Program VCS
Site Screening recommended (EV)	5/25/99 Comment:	5/25/99	Stephen Fortuna	DEQ	NWR	SAS
SITE EVALUATION	9/1/99 Comment:	9/3/99	Thomas Gainer	DEQ	NWR	SAS
Listing Review completed	9/2/99 Comment:	9/3/99	Thomas Gainer	DEQ	NŴR	SAS
Insufficient information to list	9/3/99 Comment:		Thomas Gainer	DEQ	NWR	SAS

State Expanded Preliminary Assessment recommended (XPA)	9/3/99	9/3/99	Thomas Gainer	DEQ	NWR	SAS Parati
	Comment:		5 ¹⁰			en en en en en en en en en en en en en e
SITE SCORING	9/3/99 Comment:	9/3/99	Thomas Gainer	DEQ	NWR	SAS
EXPANDED	1/24/00	11/30/00	Rodney Struck	DEQ	NWR	SRS
PRELIMINARY ASSESSMENT	: }					
	Comment:	· · · · · · · · · · · · · · · · · · ·				
NEGOTIATIONS	2/28/00	4/17/00	Rodney Struck	DEQ	NWR	VCS
	Comment:	garan garan saka saka sa				u.
Letter Agreement	4/7/00	4/17/00	Rodney Struck	DEQ	NWR	VCS
	Comment:	Letter Agreement te	rminated by DEQ on 4/17/0	00. PA/XPA to be	conducted	l by DEQ.
ORPHAN SITE	7/6/00	6/30/01	Rodney Struck	DEQ	NWR	SRS
	Comment:			ing the second of the second o	en en Sanan Elle Jahr	
REMOVAL	1/3/01	3/31/01	Rodney Struck	DEQ 1	NWR	VCS
	Comment:	• •	Same Francisco	-		***
Proposal for Confirmed Release List	10/3/02	10/3/02	Mark Pugh	DEQ	NWR	VCS
recommended				English to the control of		
2	Comment:		11 A. A. A. A. A.		1844.	
Facility proposed for Confirmed Release List	12/17/02	12/17/02	Kim Van Patten	DEQ	NWR	VCS
	Comment:		and the second of the second o		A STATE OF S	entrement of the second of the

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Remedial Action:

(11/30/2000 RGS/SRS) DEQ retained Jacobs Engineering to conduct the expanded Preliminary, Assessment (XPA). Jacobs collected soil, groundwater and sediment samples at the site in August 2000, and submitted the XPA report in November 2000. DEQ is reviewing the report to determine what further action may be necessary at the site. (4/2/01 RGS/VCS) DEQ completed removal of abandoned waste containers, drums, and batteries at the facility. (10/3/02 MTP/VCP) Because the nature and extent of contamination at the site have been fairly well documented, DEQ is considering coordinating a Prospective Purchaser Agreement (PPA), under which a prospective purchaser would be required to complete site characterization and any necessary remedial action. In-water sediment contamination at the site, which may be a result of over-water activities at the Marine Finance site, or due to contaminant migration from other sites in the area, will be referred to EPA for consideration during the proposed Portland Harbor Remedial Investigation.

Data Sources:

Associated Parties

Marine Finance Corporation Organization: Name: 8444 NW St Helens Rd Title: Land/Bsn Owner Address: Portland, OR 97231 (503) 231-8991 Phone: By: JWAGGY On: 04/21/2000 Affiliation: Legal Owner Last Updated: Active Affiliation Status: **Affiliation Comment: Party Comment:** Hendren Tow Boat Co Organization: Name: Flovd Hendren 12751 NW Springville Rd Title: Address: Portland, OR 97229 Phone: HOW IN HEALY By: JWAGGY On: 05/25/1999 Last Updated: Affiliation: Operator. Affiliation Status: Active **Affiliation Comment: Party Comment:** Mike Williams Organization: Marine Finance Corporation Name: 8444 NW St Helens Rd Address: 🗔 Title: Portland, OR 97231 (503) 286-7656 Phone: By: JWAGGY On: 04/21/2000 Affiliation: Contact Last Updated: **Affiliation Status:** Active **Party Comment:** Affiliation Comment: Environmental contact. Site Ownership:

Projects

Project IDNameStart DateEnd Date25534Marine Finance Corp. (PH)02/08/1999

Last Update

By: gmw On: December 18, 2001



The Confirmed Release List and Inventory

Informing the Public About Hazardous Substance Sites

Purpose

The purpose of this fact sheet is to describe the Confirmed Release List (CRL) and the Inventory of Hazardous Substance Sites (Inventory), and explain their relationship to the Environmental Cleanup Site Information System (ECSI) database. Maintained by the Oregon Department of Environmental Quality (DEQ) each of these tools provides information on sites where a release of hazardous substances is suspected or known to have occurred.

ECSI

One of DEQ's most basic tasks is keeping track of information about individual hazardous substance release sites. To help meet this need, ECSI was created. ECSI, an electronic database, is available to the public and can be searched for a wide range of information concerning sites with suspected or known releases of hazardous substances (except information about petroleum releases from underground storage tanks, which is available in other DEQ-maintained databases). ECSI contains information on more than 2000 sites in Oregon.

CRL

The CRL is a subset of ECSI and includes sites where a release of hazardous substances has been documented. Sites may be added to the CRL at any time after a confirmed release has been documented. There are formal processes, described in more detail below, by which sites are added to and removed from the CRL.

Inventory

About half of the sites on the CRL are also on the Inventory, a list of sites with confirmed releases that DEQ has determined also require further investigation and/or cleanup. Sites may only be added to the Inventory after a preliminary assessment (PA) or preliminary assessment equivalent (PAE) has been completed. The same formal processes for listing and de-listing sites on the CRL apply to the Inventory as well. The characteristic that distinguishes the Inventory from the CRL is that DEQ has determined, based on the PA or PAE, that further action is required to address contamination at the sites on the Inventory.

The Listing Process

DEQ adds sites to the CRL and Inventory when it determines they meet the criteria for listing:

CRL Criteria

To be added to the CRL, a site must have had a release of a hazardous substance that is confirmed by meeting both of the following criteria:

- The release has been documented by qualified observation, report or laboratory data; and
- The release is not excluded from listing by virtue of being insignificant in quantity or hazard, regulated by another program, having been adequately cleaned up or otherwise requiring no further action.

Once listed on the CRL, a site typically has a PA or PAE completed. A PA or PAE provides an in-depth review of a site's operating history and potential extent of contamination, and describes ways in which site contamination could affect human health and the environment.

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Inventory Criteria DEQ adds sites to the Inventory where further investigation is required and where removal, remedial action, or engineering or institutional controls are needed to protect public health, safety or welfare or the environment. Sites are added to the Inventory based on a PA or PAE approved or conducted by DEQ and other available information.

Procedure

Prior to adding a site to either the CRL or the Inventory, DEQ notifies site owners and operators and allows them to comment on the proposed listing or provide additional information they think might be relevant to the listing decision. Owners and operators are given a 45 day period, which can be extended by an additional 45 days upon request, to comment on the proposed listing. DEQ responds to substantive comments and new information in writing. Comments or new information sometimes indicate that the site does not meet the listing criteria. In any case, after reviewing comments, DEQ makes its decision about listing and sends a letter responding to comments and notifying the owners and operators of the listing decision. Sometimes, a meeting will be held to further discuss issues bearing on the listing decision. The actual listing usually happens within 90 days of receiving comments.

De-listing Sites

DEQ removes sites from the CRL and Inventory when all necessary investigation or other remedial action has been completed and after a public comment period. In addition, an owner, operator or other person may petition the Director to remove a facility from the list(s). DEQ will consider the same criteria under which the site was listed in reaching a decision about de-listing a site. The period for public comment on a proposal to de-list a site is at least 30 days and may be extended under certain circumstances.

In some cases, site cleanups will consist of, or will include, engineering or institutional controls. For example, after removing some of the contaminated soil from a site, other measures such as an engineering cap and a deed restriction may be implemented to protect public health and the environment. If selected or approved by DEQ as part of a cleanup remedy, institutional and engineering controls are considered to be ongoing remedial actions, and such sites must remain on the CRL and Inventory.

CRL and Inventory Reports DEQ updates the CRL and Inventory quarterly and provides summaries of these updated lists to interested persons. These summaries identify the listed sites and include key information about each site. In addition, a more extensive facility report is available upon request for each site listed on the CRL and/or Inventory.

DEQ has available, at most of its offices, public access to a searchable database, called OPENS, containing most of the information in ECSI.

For More Information about Listing; Process of Reports Contact DEO's Site Assesssment Program at (503) 229-5913 or within Oregon at: (800) 452-4011

Internet address.

http://www.deg.state.or/us/wmc/cleanup/clean.htm

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Summary of Oregon Statutes and Rules Relating to the Confirmed Release List (CRL) and Inventory

This document summarizes Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR) pertaining to CRL and Inventory listing. The following web pages contain the full text of ORS (http://landru.leg.state.or.us/ors/) and OAR (http://arcweb.sos.state.or.us/rules/OARS_300/OAR_340/340_122.html).

ORS 465.215: List of facilities with confirmed release.

ORS 465.225: Inventory of facilities needing environmental controls; preliminary assessment; notice to operator; criteria for adding facilities to inventory.

ORS 465.230: Removal of facilities from Inventory; criteria.

ORS 465.235: Public inspection of Inventory; information included in Inventory; organization; report; action plan.

ORS 465.240: Inventory listing not prerequisite to other remedial action.

ORS 465.405: Rules; "confirmed release"; "preliminary assessment."

ORS 465.410: Ranking of Inventory according to risk; rules.

OAR 340-122-072: Preliminary Assessments.

OAR 340-122-073: Confirmation of a Release.

OAR 340-122-074: Development of a Confirmed Release List.

OAR 340-122-075: Development of Inventory.

OAR 340-122-076: Inventory Ranking.

OAR 340-122-077: Initiation of Process for Delisting Facilities from the Confirmed Release List and Inventory.

OAR 340-122-078: Inventory Delisting – Public Notice and Participation.

OAR 340-122-079: Delisting - Determination by Director.

A. Purpose of Listing (ORS 465.215 and 465.225)

The purpose of CRL and Inventory listing is to notify the public of a contaminated property. <u>It is NOT the purpose of listing to assign liability for any contamination.</u>

B. Definition of a Confirmed Release (ORS 465.405; OAR 340-122-073)

A confirmed release is a release of a hazardous substance above background levels that is not excluded by any of the following factors:

- 1. DEQ considers the release de minimis (i.e., insignificant); or
- 2. DEQ determines that the release dissipates rapidly and poses no significant threat; or
- 3. DEQ or EPA has authorized the release by permit, AND such a permitted release has not accumulated or migrated; or
- 4. The release consists of a registered pesticide product that has been applied appropriately and has not accumulated or migrated; or
- 5. DEQ determines that remedial action has eliminated any risks the release may have posed to human health or the environment; or
- 6. DEQ determines that the release requires no further investigation, cleanup, or long-term institutional or engineering controls to protect human health or the environment.

ORS 465.215 requires DEQ to add all sites with confirmed releases to the CRL. OAR 340-122-073 requires sites needing long-term institutional or engineering controls to remain on the CRL, even if DEQ has made a No Further Action determination for the site.

C. Documentation of a Confirmed Release (OAR 340-122-073)

There are three ways to document a confirmed release:

- 1. Observation of site conditions by a qualified government agent; or
- 2. A written admission of a release from a site Owner/Operator or his/her authorized agent; or
- 3. Laboratory (sampling) data.

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D. Criteria for Inventory Listing (ORS 465.225; OAR 340-122-072 and 340-122-075) A site qualifies for the Inventory if it is eligible for (or already listed on) the CRL, and DEQ has determined, based on information from a Preliminary Assessment (PA) or equivalent, that further action is needed to ensure the protection of human health or the environment. In other words, DEQ must have conducted at least a PA-level evaluation of a site before listing the site on the Inventory. Furthermore, before conducting a PA or equivalent, DEQ must notify owners and operators of its intent to do so, and solicit information from owners/operators that will make the PA as current and accurate as possible.

In order to be called a PA or equivalent, a document (or group of documents) must contain at least the following information:

- Enough site background and current status information, including on-site observations, maps, facility data, and sampling data, to enable DEQ to conclude whether further action is needed to ensure the protection of human health or the environment.
- A description of past and current site operations, including use, management, and compliance history related to hazardous substances, and past investigations and cleanups of hazardous substance releases.
- A description of the presence and extent of hazardous substances at a site, including (if known) specific on-site sources of contamination, quantities released, and the extent of migration. This section must include maps showing facility boundaries, areas of contamination, and significant topographic and ecological features.
- Identification of past and present facility owners and operators.
- A description of the ways in which human or environmental receptors could be exposed to site contaminants (i.e., soil/direct contact, surface water, groundwater, or air emissions).
- Conclusions as to whether a site presents current or future threats to human health or the environment, and what additional actions, if any, are needed to address these threats.

ORS 465.225 requires DEQ to list all qualifying sites on the Inventory, and, in conjunction with OAR 340-122-075, requires sites needing long-term institutional or engineering controls to remain on the Inventory, even if DEQ has made a No Further Action determination for the site.

- E. Notification Requirements for CRL Listing (ORS 465.215; OAR 340-122-074) At least 60 days before listing a site on the CRL, DEQ must notify all known site owners and operators via certified mail of its intent to list the site. This notice states that owners and operators have 45 days to submit any comments on the listing proposal, and may request one extension of up to 45 additional days to comment. DEQ must respond in writing to all comments on the listing proposal when making its final listing decision. The list of facilities actually on the CRL needs to include the information shown below (if known). However, DEQ generally provides this information to owners and operators when proposing a site for the CRL:
- A facility description, with address or location.
- Information about the release, including how and when it occurred, the types and quantities of hazardous substances involved, and names of persons who may have owned/operated the facility while the release occurred.
- The nature of contamination at the facility and the status of remedial actions that may have occurred.
- F. Notification Requirements for Inventory Listing (ORS 465.225; OAR 340-122-075 and 340-122-076)

At least 60 days before listing a site on the Inventory, DEQ must notify all known site owners and operators via certified mail of its intent to do so. This notice states that owners and operators have 45 days to submit any comments on the listing proposal, and may request one extension of

Oregon DEQ's Summary of Listing Statutes and Rules Page 2 of 3

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up to 45 additional days to comment. DEQ must respond in writing to all comments on the listing proposal when making its final listing decision. The list of facilities actually on the Inventory needs to include the information shown below (if known). As with the CRL, however, DEQ generally provides this information to owners and operators when proposing a site for the Inventory:

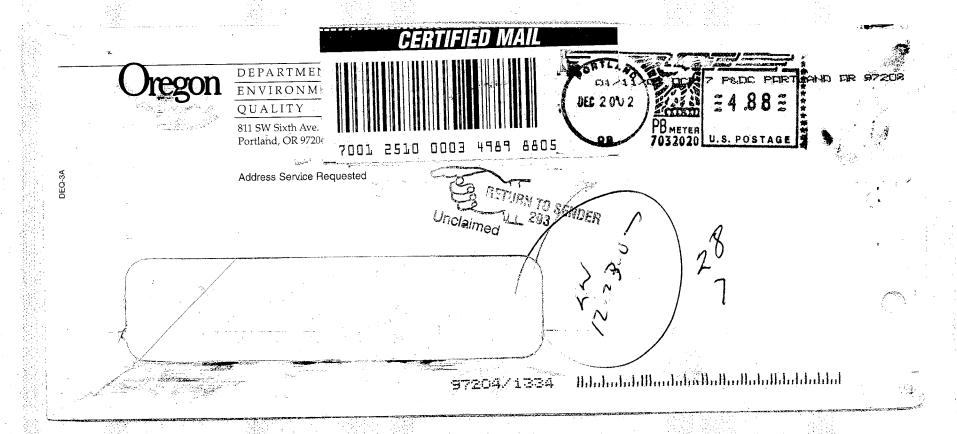
- All of the information shown in Section E above (i.e., the facility must have a confirmed release).
- A PA or PA equivalent (described in Section D above), which concludes that further investigation, remedial action, or long-term controls are needed to ensure the protection of human health or the environment. (DEQ does not include a PA or equivalent with the Inventory proposal notice if it has previously sent the PA or equivalent to facility owners/operators.)
- A description of threats the facility may pose to human health or the environment, and the relative ranking that DEQ has assigned to such threats (i.e., low, medium, or high).
- The source of funding for remedial action (often not known at the Inventory proposal stage).
- G. Delisting Sites from the CRL (ORS 465.230; OAR 340-122-077 and 340-122-079) (The information in this section applies to sites on the CRL only; see Section H below for delisting sites that are also on the Inventory.) DEQ must remove (delist) a site from the CRL if new information or documented remedial action demonstrates to DEQ that the site no longer meets the CRL criteria described in Section B above. DEQ may delist a site on its own initiative as part of its oversight of investigative or remedial actions. Alternatively, owners/operators, or other persons "adversely affected by the listing," may submit a written petition to DEQ that requests CRL delisting. Such a petition must contain new information (such as documentation of a cleanup) demonstrating that the site no longer meets the CRL criteria described in Section B above. If DEQ agrees with the petitioner (or has initiated CRL removal on its own), DEQ will delist the site from the CRL. No public notice is required for this action, which is effective immediately.

A site needing long-term institutional or engineering controls cannot be removed from the CRL, even if DEQ has made a No Further Action determination for the site.

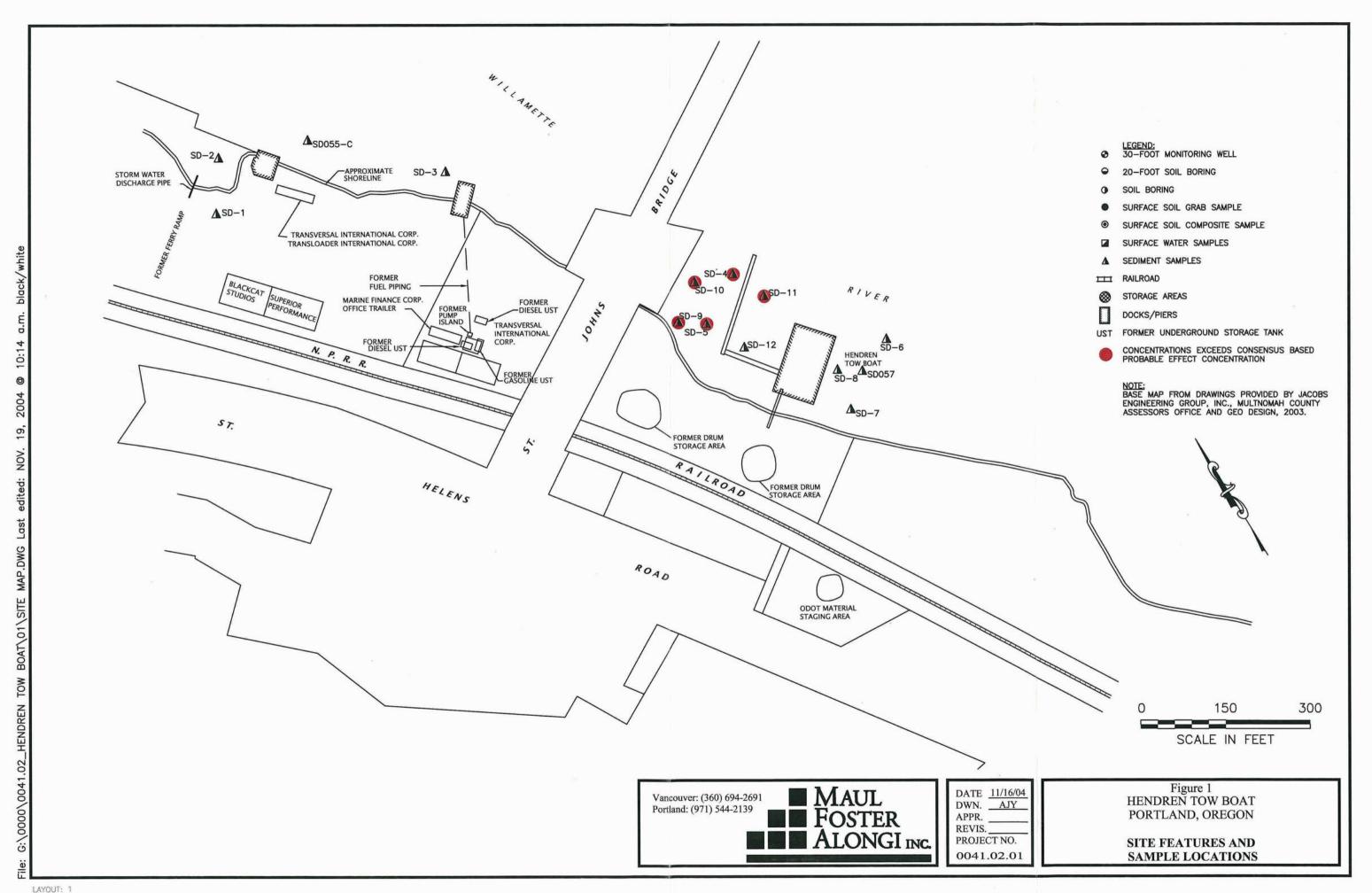
H. Delisting Sites from the CRL and Inventory (ORS 465.230; OAR 340-122-077 through 340-122-079) DEQ must remove a site from the CRL and Inventory if new information or documented remedial action demonstrates to DEQ that the site no longer meets the CRL criteria described in Section B above. DEQ may delist a site on its own initiative as part of its oversight of investigative or remedial actions. Alternatively, owners/operators, or other persons "adversely affected by the listing," may submit a written petition to DEQ that requests CRL and Inventory delisting. Such a petition must contain new information (e.g., documentation of a cleanup) demonstrating that the site no longer meets the CRL criteria described in Section B above.

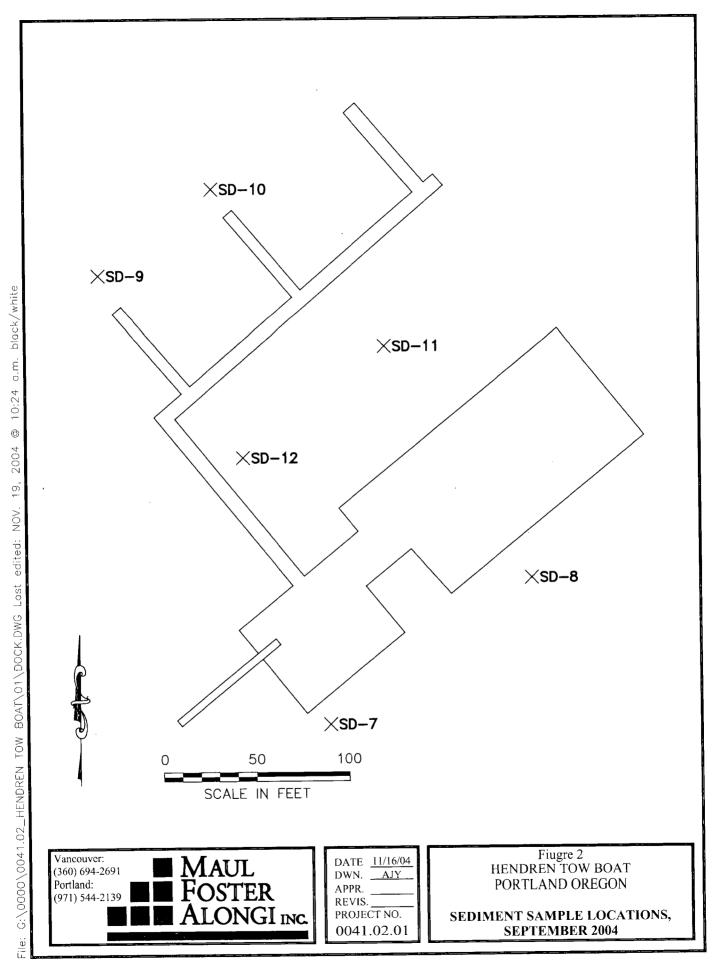
If DEQ believes that a site should be removed from the CRL and Inventory, it is required to notify the public of the proposed delisting, and allow for a 30- to 90-day comment period (depending on the level of interest shown). At the end of the public comment period, DEQ makes a delisting decision that is based on any comments received and all relevant information in the site file. A decision to delist is effective immediately.

A site needing long-term institutional or engineering controls cannot be removed from the Inventory, even if DEQ has made a No Further Action determination for the site.



COMPLETE THIS SECTION ON DELIVERY SENDER: COMPLETE THIS SECTION A. Signature ■ Complete items 1, 2, and 3. Also complete ☐ Agent item 4 if Restricted Delivery is desired. X □ Addressee ■ Print your name and address on the reverse so that we can return the card to you. B. Received by (Printed Name) C. Date of Delivery Attach this card to the back of the mailpiece, or on the front if space permits. If YES, enter delivery address below: Article Addressed to: MIKE IS! !!!AMS MARINE FINANCE GO SULLY NO ST. HELENS RES Problems De 9723! Service Type ☐ Express Mail ☐ Certified Mail ☐ Return Receipt for Merchandise ☐ Registered ☐ C.O.D. ☐ Insured Mail 4. Restricted Delivery? (Extra Fee) Yes 7001 2510 0003 4989 8805 2. Article Number (Transfer from service label) PS Form 3811, August 2001





LAYOUT: 1



Vancouver: (360) 694-2691
Portland: (971) 544-2139

FOSTER
ALONGI INC.

DATE 11/16/04 DWN. AJY APPR. REVIS.

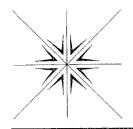
REVIS. PROJECT NO. 0041.02.01

SED

Figure 3 HENDREN TOW BOAT PORTLAND, OREGON

SEDIMENT SAMPLE LOCATIONS, SEPTEMBER 2004

LAYOUT: 1



19761 S.W. 95th Place Tualatin, OR 97062 (503) 612-9007 Fax (503) 612-8572 1 (877) 612-9007

1453 C 0 0004

October 25, 2004

WW

Anna St. John Maul, Foster & Alongi 3121 SW Moody Avenue Suite 200 Portland, OR 97201

TEL: (971) 544-2139 FAX (971) 544-2140

RE: Hendren Sediment Sampling / 0100.01.01

Dear Anna St. John:

Order No.: 0409129

Specialty Analytical received 6 samples on 9/28/2004 for the analyses presented in the following report.

There were no problems with the analysis and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative, or as qualified with flags. Results apply only to the samples analyzed. Without approval of the laboratory, the reproduction of this report is only permitted in its entirety.

If you have any questions regarding these tests, please feel free to call.

Sincerely,

Ned Engleson

Project Manager

Fechnical Review

Volatile Solids (% of Total Sample)

Date: 25-Oct-04

CLIENT:

Maul, Foster & Alongi

Lab Order:

0409129

Project:

Hendren Sediment Sampling / 0100.01.01

9/28/2004 10:18:00 AM 0409129-01 Collection Date: Lab ID: Matrix: SEDIMENT SD-7 Client Sample ID: Analyses Result Limit Qual Units DF Date Analyzed **NWTPH-DX** Analyst: tlf NWTPH-DX 10/5/2004 Diesel 57.0 25.2 Α1 mg/Kg-dry 1 1 10/5/2004 Lube Oil 165 84.0 A2 mg/Kg-dry %REC 1 10/5/2004 102 50-150 Surr: o-Terphenyl **NWTPH-GX** Analyst: tlf **NWTPH-GX** 10/4/2004 1 ND 4.20 mg/Kg-dry Gasoline 10/4/2004 50-150 %REC 1 Surr: 4-Bromofluorobenzene 99.4 Analyst: bda 8270SIM PAH'S BY GC/MS-OARSIM 10/5/2004 6:17:00 PM 146 11.2 μg/Kg-dry 1 Acenaphthene 11.2 1 10/5/2004 6:17:00 PM 112 µg/Kg-dry Acenaphthylene 190 11.2 μg/Kg-dry 1 10/5/2004 6:17:00 PM Anthracene 11.2 μg/Kg-dry 1 10/5/2004 6:17:00 PM 828 Benz(a)anthracene 11.2 μg/Kg-dry 1 10/5/2004 6:17:00 PM Benzo(a)pyrene 1230 10/5/2004 6:17:00 PM Benzo(b)fluoranthene 1160 11.2 μg/Kg-dry 1 10/5/2004 6:17:00 PM 789 11.2 µg/Kg-dry 1 Benzo(g,h,i)perylene 11.2 1 10/5/2004 6:17:00 PM 368 µg/Kg-dry Benzo(k)fluoranthene 10/5/2004 6:17:00 PM 11.2 1 762 µg/Kg-dry Chrysene 167 11.2 μg/Kg-dry 1 10/5/2004 6:17:00 PM Dibenz(a,h)anthracene 11.2 10/5/2004 6:17:00 PM 1630 μg/Kg-dry Fluoranthene 11.2 1 10/5/2004 6:17:00 PM 137 μg/Kg-dry Fluorene 10/5/2004 6:17:00 PM 11.2 1 639 μg/Kg-dry Indeno(1,2,3-cd)pyrene 10/5/2004 6:17:00 PM 150 11.2 μg/Kg-dry 1 Naphthalene 826 11.2 μg/Kg-dry 1 10/5/2004 6:17:00 PM Phenanthrene 10/5/2004 6:17:00 PM 1680 11.2 μg/Kg-dry Pyrene 10/5/2004 6:17:00 PM 42.6-128 %REC 1 35.5 Surr: 2-Fluorobiphenyl %REC 10/5/2004 6:17:00 PM 21.7-155 Surr: Nitrobenzene-d5 47.3 Surr: p-Terphenyl-d14 81.9 44.9-155 %REC 1 10/5/2004 6:17:00 PM D422 Analyst: sub PARTICAL SIZE DISTRIBUTION Partical Size 10/4/2004 See Sub Report TOTAL SOLIDS A2216 Analyst: are 10/11/2004 Total Solids 55.7 %-wt Analyst: jrp ORGANIC CARBON, TOTAL SW9060 5.93 10/21/2004 Total Organic Carbon 22000 997 mg/Kg-dry **VOLATILE SOLIDS IN SOLIDS** vss Analyst: are 10/11/2004 Volatile-Solids-7.54 1.00

4.20

1.00

%-wt

1

10/11/2004

Date: 25-Oct-04

CLIENT:

Maul, Foster & Alongi

Lab Order:

0409129

Project:

Hendren Sediment Sampling / 0100.01.01

Lab ID: 0409129-02			(Collection Date:	9/28/200 SEDIM	04 10:52:00 AM
Client Sample ID: SD-8				Matrix:	SEDIM	EN I
Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
NWTPH-DX		NWTPH-DX				Analyst: tlf
Diesel	ND	27.3		mg/Kg-dry	1	10/5/2004
Lube Oil	114	91.1	A2	mg/Kg-dry	1	10/5/2004
Surr: o-Terphenyl	75.4	50-150		%REC	1	10/5/2004
NWTPH-GX		NWTPH-GX				Analyst: tlf
Gasoline	ND ND	4.55		mg/Kg-dry	1	10/4/2004
Surr: 4-Bromofluorobenzene	105	50-150		%REC	1	10/4/2004
PAH'S BY GC/MS-OARSIM		8270SIM				Analyst: bd a
Acenaphthene	59.5	12.1		µg/Kg-dry	1	10/5/2004 7:50:00 PM
Acenaphthylene	57.1	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Anthracene	78.9	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Benz(a)anthracene	404	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Benzo(a)pyrene	613	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Benzo(b)fluoranthene	633	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Benzo(g,h,i)perylene	369	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Benzo(k)fluoranthene	202	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Chrysene	363	12.1		µg/Kg-dry	1	10/5/2004 7:50:00 PM
Dibenz(a,h)anthracene	83.8	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Fluoranthene	811	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Fluorene	47.4	12.1		µg/Kg-dry	1	10/5/2004 7:50:00 PM
Indeno(1,2,3-cd)pyrene	304	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Naphthalene	53.4	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Phenanthrene	304	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Pyrene	832	12.1		μg/Kg-dry	1	10/5/2004 7:50:00 PM
Surr: 2-Fluorobiphenyl	28.6	42.6-128	S	%REC	1	10/5/2004 7:50:00 PM
Surr: Nitrobenzene-d5	49.4	21.7-155		%REC	1	10/5/2004 7:50:00 PM
Surr: p-Terphenyl-d14	68.3	44.9-155		%REC	1	10/5/2004 7:50:00 PM
PARTICAL SIZE DISTRIBUTION Partical Size	See Sub Report	D422			1	Analyst: sut 10/4/2004
	,	A2216				Analyst: are
TOTAL SOLIDS Total Solids	54.6	A2210		% - w t	1	10/11/2004
ORGANIC CARBON, TOTAL Total Organic Carbon	15200	SW9060 1220		mg/Kg-dry	6.72	Analyst: jrp 10/23/2004
VOLATILE SOLIDS IN SOLIDS	6,44.	VSS 1.00		%-wt	1	Analyst: are
Volatile Solids Volatile Solids (% of Total Sample)	3.51	1.00		%-wt	1	10/11/2004

Volatile Solids (% of Total Sample)

Date: 25-Oct-04

CLIENT:

Maul, Foster & Alongi

Lab Order:

0409129

Project:

Hendren Sediment Sampling / 0100.01.01

Lab ID: 0409129-03			(Collection Date:	9/28/200	04 11:10:00 AM
Client Sample ID: SD-9				Matrix:	SEDIM	ENT
Analyses	Result	Limit (Qual	Units	DF	Date Analyzed
NWTPH-DX		NWTPH-DX	-			Analyst: tlf
Diesel	171	25.0 .	Α1	mg/Kg-dry	1	10/5/2004
Lube Oil	296	83.2	A2	mg/Kg-dry	1	10/5/2004
Surr: o-Terphenyl	86.1	50-150		%REC	1	10/5/2004
NWTPH-GX		NWTPH-GX				Analyst: tlf
Gasoline	39.8	4.16		mg/Kg-dry	1	10/4/2004
Surr: 4-Bromofluorobenzene	113	50-150		%REC	1	10/4/2004
PAH'S BY GC/MS-OARSIM		8270SIM				Analyst: bda
Acenaphthene	1600	11.1		μg/Kg-dry	1	10/5/2004 3:10:00 PM
Acenaphthylene	298	11.1		μg/Kg-dry	1	10/5/2004 3:10:00 PM
Anthracene	1620	11.1		μg/Kg-dry	1	10/5/2004 3:10:00 PM
Benz(a)anthracene	4130	222		μg/Kg-dry	20	10/5/2004 8:21:00 PM
Benzo(a)pyrene	6590	222		μg/Kg-dry	20	10/5/2004 8:21:00 PM
Benzo(b)fluoranthene	5860	222		µg/Kg-dry	20	10/5/2004 8:21:00 PM
Benzo(g,h,i)perylene	4700	222		μg/Kg-dry	20	10/5/2004 8:21:00 PM
Benzo(k)fluoranthene	1360	11.1		µg/Kg-dry	1	10/5/2004 3:10:00 PM
Chrysene	4080	222		μg/Kg-dry	20	10/5/2004 8:21:00 PM
Dibenz(a,h)anthracene	656	11.1		μg/Kg-dry	1	10/5/2004 3:10:00 PM
Fluoranthene	14100	222		µg/Kg-dry	20	10/5/2004 8:21:00 PM
Fluorene	1330	11.1		μg/Kg-dry	1	10/5/2004 3:10:00 PM
Indeno(1,2,3-cd)pyrene	3480	222		μg/Kg-dry	20	10/5/2004 8:21:00 PM
Naphthalene	989	11.1		µg/Kg-dry	1	10/5/2004 3:10:00 PM
Phenanthrene	13500	222		μg/Kg-dry	20	10/5/2004 8:21:00 PM
Pyrene	15800	222		µg/Kg-dry	20	10/5/2004 8:21:00 PM
Surr: 2-Fluorobiphenyl	69.3	42.6-128		%REC	1	10/5/2004 3:10:00 PM
Surr: Nitrobenzene-d5	73.9	21.7-155		%REC	1	10/5/2004 3:10:00 PM
Surr: p-Terphenyl-d14	107	44.9-155		%REC	1	10/5/2004 3:10:00 PM
PARTICAL SIZE DISTRIBUTION Partical Size	See Sub Report	D422			1	Analyst: sub 10/4/2004
TOTAL SOLIDS		A2216				Analyst: are
Total Solids	62.6	1.00		% - w t	1	10/7/2004
ORGANIC CARBON, TOTAL		SW9060				Analyst: jrp
Total Organic Carbon	17200	750		mg/Kg-dry	4.51	10/21/2004
VOLATILE SOLIDS IN SOLIDS		vss				Analyst: are
Volatile Solids	6.82	1.00		%-wt	1	10/7/2004

4.27

1.00

%-wt

10/7/2004

Date: 25-Oct-04

Lab Order:

0409129

CLIENT: Maul, Foster & Alongi

Project: Hendren Sediment Sampling / 0100.01.01

Lab ID: 0409129-04 **Collection Date:** 9/28/2004 12:24:00 PM

Client Sample ID: SD-10				Matri	x: SEDIM	ENT
Analyses	Result	Limit	Qual U	Jnits	DF	Date Analyzed
NWTPH-DX		NWTPH-DX				Analyst: tlf
Diesel	335	23.6	n	ng/Kg-dry	1	10/5/2004
Lube Oil	389	78.7	n	ng/Kg-dry	1	10/5/2004
Surr: o-Terphenyl	96.4	50-150	9/	%REC	1	10/5/2004
IWTPH-GX		NWTPH-GX				Analyst: tlf
Gasoline	65.3	3.94	n	ng/Kg-dry	1	10/4/2004
Surr: 4-Bromofluorobenzene	111	50-150	9	%REC	1	10/4/2004
PAH'S BY GC/MS-OARSIM		8270SIM				Analyst: bda
Acenaphthene	4540	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Acenaphthylene	509	10.5	μ	ıg/Kg-dry	1	10/5/2004 3:41:00 PM
Anthracene	10800	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Benz(a)anthracene	9850	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Benzo(a)pyrene	14600	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Benzo(b)fluoranthene	11700	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Benzo(g,h,i)perylene	9780	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Benzo(k)fluoranthene	3510	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Chrysene	7810	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Dibenz(a,h)anthracene	1150	10.5	μ	ıg/Kg-dry	1	10/5/2004 3:41:00 PM
Fluoranthene	33100	210	· µ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Fluorene	4930	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Indeno(1,2,3-cd)pyrene	6800	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Naphthalene	835	10.5	μ	ıg/Kg-dry	1	10/5/2004 3:41:00 PM
Phenanthrene	34900	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Pyrene	41700	210	μ	ıg/Kg-dry	20	10/5/2004 8:52:00 PM
Surr: 2-Fluorobiphenyl	67.9	42.6-128	9	%REC	1	10/5/2004 3:41:00 PM
Surr: Nitrobenzene-d5	69.7	21.7-155	9	%REC	1	10/5/2004 3:41:00 PM
Surr: p-Terphenyl-d14	119	44.9-155	9	%REC	1	10/5/2004 3:41:00 PM
PARTICAL SIZE DISTRIBUTION		D422				Analyst: sub
Partical Size	See Sub Report				1	10/4/2004
TOTAL SOLIDS		A2216				Analyst: are
Total Solids	54.9	1.00	9	%-wt	1	10/7/2004
DRGANIC CARBON, TOTAL		SW9060				Analyst: jrp
Total Organic Carbon	21400	901	n	ng/Kg-dry	5.72	10/23/2004
VOLATILE SOLIDS IN SOLIDS		vss				Analyst: are
Volatile Solids	10.7	1.00	9	%-wt	1	10/7/2004
Volatile Solids (% of Total Sample)	5.88	1.00	9	%-wt	1	10/7/2004

Date: 25-Oct-04

CLIENT: Project:

Maul, Foster & Alongi

Hendren Sediment Sampling / 0100.01.01

Lab Order:

0409129

Lab ID:

0409129-05

Collection Date: 9/28/2004 12:46:00 PM

Lab ID: 0409129-05			Collection Date:		4 12:46:00 PM
Client Sample ID: SD-11			Matrix:	SEDIM	EN I
Analyses	Result	Limit Qu	ual Units	DF	Date Analyzed
WTPH-DX		NWTPH-DX			Analyst: tlf
Diesel	128	24.5	mg/Kg-dry	1	10/5/2004
Lube Oil	257	81.8	mg/Kg-dry	1	10/5/2004
Surr: o-Terphenyl	105	50-150	%REC	1	10/5/2004
IWTPH-GX		NWTPH-GX			Analyst: tlf
Gasoline	29.9	4.09	mg/Kg-dry	1	10/4/2004
Surr: 4-Bromofluorobenzene	107	50-150	%REC	1	10/4/2004
PAH'S BY GC/MS-OARSIM		8270SIM			Analyst: bda
Acenaphthene	690	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Acenaphthylene	171	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Anthracene	373	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Benz(a)anthracene	1110	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Benzo(a)pyrene	2110	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Benzo(b)fluoranthene	1750	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Benzo(g,h,i)perylene	1760	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Benzo(k)fluoranthene	544	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Chrysene	1060	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Dibenz(a,h)anthracene	208	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Fluoranthene	4260	218	μg/Kg-dry	20	10/5/2004 9:24:00 PM
Fluorene	518	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Indeno(1,2,3-cd)pyrene	1220	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Naphthalene	560	10.9	μg/Kg-dry	1	10/5/2004 4:12:00 PM
Phenanthrene	3510	218	μg/Kg-dry	20	10/5/2004 9:24:00 PM
Pyrene	4950	218	μg/Kg-dry	20	10/5/2004 9:24:00 PM
Surr: 2-Fluorobiphenyl	58.9	42.6-128	%REC	1	10/5/2004 4:12:00 PM
Surr: Nitrobenzene-d5	61.6	21.7-155	%REC	1	10/5/2004 4:12:00 PM
Surr: p-Terphenyl-d14	88.9	44.9-155	%REC	1	10/5/2004 4:12:00 PM
PARTICAL SIZE DISTRIBUTION		D422			Analyst: sub
Partical Size	See Sub Report			1	10/4/2004
TOTAL SOLIDS		A2216			Analyst: are
Total Solids	61.4	1.00	%-wt	1	10/7/2004
ORGANIC CARBON, TOTAL		SW9060			Analyst: jrp
Total Organic Carbon	13100	853	mg/Kg-dry	5.21	10/23/2004
VOLATILE SOLIDS IN SOLIDS		vss			Analyst: are
Volatile-Solids	6.25	1:00		1	10/7/2004
Volatile Solids (% of Total Sample)	3.84	1.00	% - w t	1	10/7/2004

Date: 25-Oct-04

CLIENT:

Maul, Foster & Alongi

Lab Order:

0409129

Project:

Hendren Sediment Sampling / 0100.01.01

Lab ID: 0409129-06			Col	lection Date:	9/28/200	04 1:01:00 PM
Client Sample ID: SD-12				Matrix:	SEDIM	ENT
Analyses	Result	Limit	Qual U	nits	ÐF	Date Analyzed
NWTPH-DX		NWTPH-DX				Analyst: tlf
Diesel	ND	25.6	m _i	g/Kg-dry	1	10/11/2004
Lube Oil	ND	85.3	m	g/Kg-dry	1	10/11/2004
Surr: o-Terphenyl	65.7	50-150	%	REC	1	10/11/2004
NWTPH-GX		NWTPH-GX				Analyst: tlf
Gasoline	7.94	4.27	m	g/Kg-dry	1	10/4/2004
Surr: 4-Bromofluorobenzene	98.9	50-150	%	REC	1	10/4/2004
PAH'S BY GC/MS-OARSIM		8270SIM				Analyst: bd a
Acenaphthene	72.8	11.4	μς	g/Kg-dry	1	10/5/2004 4:43:00 PM
Acenaphthylene	45.5	11.4	μ	g/Kg-dry	1	10/5/2004 4:43:00 PM
Anthracene	81.9	11.4	μg	g/Kg-dry	1	10/5/2004 4:43:00 PM
Benz(a)anthracene	474	11.4	μç	g/Kg-dry	1	10/5/2004 4:43:00 PM
Benzo(a)pyrene	586	11.4	μ	J/Kg-dry	1	10/5/2004 4:43:00 PM
Benzo(b)fluoranthene	834	11.4	μg	g/Kg-dry	1	10/5/2004 4:43:00 PM
Benzo(g,h,i)perylene	433	11.4	μg	g/Kg-dry	1	10/5/2004 4:43:00 PM
Benzo(k)fluoranthene	272	11.4	μģ	g/Kg-dry	1	10/5/2004 4:43:00 PM
Chrysene	495	11.4	μg	g/Kg-dry	1	10/5/2004 4:43:00 PM
Dibenz(a,h)anthracene	126	11.4	μ	g/Kg-dry	1	10/5/2004 4:43:00 PM
Fluoranthene	943	11.4	μģ	J/Kg-dry	1	10/5/2004 4:43:00 PM
Fluorene	54.6	11.4		g/Kg-dry	1	10/5/2004 4:43:00 PM
Indeno(1,2,3-cd)pyrene	374	11.4		g/Kg-dry	1	10/5/2004 4:43:00 PM
Naphthalene	77.4	11.4		g/Kg-dry	1	10/5/2004 4:43:00 PM
Phenanthrene	394	11.4		g/Kg-dry	1	10/5/2004 4:43:00 PM
Pyrene	885	11.4		g/Kg-dry	1	10/5/2004 4:43:00 PM
Surr: 2-Fluorobiphenyl	59.7	42.6-128		REC	1	10/5/2004 4:43:00 PM
Surr: Nitrobenzene-d5	57.9	21.7-155		REC	1	10/5/2004 4:43:00 PM
Surr: p-Terphenyl-d14	92.8	44.9-155	%	REC	1	10/5/2004 4:43:00 PM
PARTICAL SIZE DISTRIBUTION Partical Size	See Sub Report	D422			1	Analyst: sut 10/4/2004
TOTAL SOLIDS		A2216				Analyst: are
Total Solids	58.3	1.00	%	-wt	1	10/7/2004
ORGANIC CARBON, TOTAL Total Organic Carbon	13200	SW9060 962	m	g/Kg-dry	5.64	Analyst: jrp 10/23/2004
VOLATILE SOLIDS IN SOLIDS	10200	VSS	111	əə w.j		Analyst: are
Volatile Solids	5.90-		%	-wt	1	10/7/2004
Volatile Solids (% of Total Sample)	3.44	1.00		-wt	1	10/7/2004

Date: 25-Oct-04

CLIENT:

Maul, Foster & Alongi

WorkOrder:

0409129

Project:

Hendren Sediment Sampling/0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: NWTPHDX_S

Sample ID MBLK	SampType:	MBLK	TestCode	NWTPHD:	X_S Units: mg/Kg		Prep Dat	te: 10/4/20	004	Run ID: C	GC-M_041005	A
Client ID: ZZZZZ	Batch ID:	11945	TestNo	NWTPH-D	×		Analysis Da	te: 10/5/20	004	SeqNo: 2	81958	
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel		ND	15.0									
_ube Oil		ND	-50.0						_			
Surr:o-Terpheny		33.82	1.00	33.33	0	101	50	150	0	()	
Sample ID MBLK	SampType:	MBLK	TestCode	: NWTPHD	X_S Units: mg/Kg		Prep Dat	te: 10/4/20	004	Run ID: 0	C-M_041006	Α
Client ID: ZZZZZ	Batch ID:	11945	TestNo	: NWTPH-D)x		Analysis Da	te: 10/6/20	004	SeqNo: 2	82369	
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel		ND	15.0									
Lube Oil		ND	50.0								_	
Surr: o-Terpheny	1.	33.82	1.00	33.33	0	101	50	150	0	· · · · · · · · · · · · · · · · · · ·) 	
Sample ID MBLK	SampType:	MBLK	TestCode	NWTPHD	X_S Units: mg/Kg		Prep Dat	te: 10/11/	2004	Run ID: (GC-M_041011	В
	į.						Analysis Da	to: 10/11/	2004	SeqNo: 2	83245	
Client ID: ZZZZZ	Batch ID:	11989	TestNo	: NWTPH-D	X.		Allalysis Da	ite. ruilii.	2.004	ocqivo.	.032.43	
	Batch ID:	11989 Result			SPK Ref Val	%REC			RPD Ref Val	%RPD		Qua
Analyte	Batch ID:									,		Qua
Analyte	Batch ID:	Result	PQL							%RPD	RPDLimit	Qua
Analyte		Result ND	PQL 15.0							%RPD		Qua
Analyte Diesel Lube Oil Surr:o-Terpheny		Result ND ND 35.2	PQL 15.0 50.0 1.00	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	
Analyte Diesel Lube Oil Surr:o-Terpheny Sample ID LCS	1	Result ND ND 35.2 LCS	PQL 15.0 50.0 1.00 TestCode	SPK value	SPK Ref Val 0 X_S Units: mg/Kg	%REC	LowLimit 50	HighLimit 150 te: 10/4/2	RPD Ref Val 0	%RPD	RPDLimit	
Analyte Diesel Lube Oil Surr: o-Terpheny Sample ID LCS Client ID: ZZZZZ	SampType:	Result ND ND 35.2 LCS	PQL 15.0 50.0 1.00 TestCode	33.33 : NWTPHD	SPK Ref Val 0 X_S Units: mg/Kg	%REC	LowLimit 50 Prep Da Analysis Da	HighLimit 150 te: 10/4/2 ate: 10/5/2	RPD Ref Val 0	%RPD	RPDLimit O GC-M_041005 281959	
Analyte Diesel Lube Oil Surr: o-Terpheny Sample ID LCS	SampType:	Result ND ND 35.2 LCS 11945	PQL 15.0 50.0 1.00 TestCode	33.33 : NWTPHD	SPK Ref Val 0 X_S Units: mg/Kg	%REC 106	LowLimit 50 Prep Da Analysis Da	HighLimit 150 te: 10/4/2 ate: 10/5/2	0004	%RPD RunID: (SeqNo: 2 %RPD	RPDLimit O GC-M_041005 281959	iΑ

J Analyte detected below quantitation limits

R - RPD outside accepted recovery limits

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Maul, Foster & Alongi

WorkOrder:

0409129

Project:

Hendren Sediment Sampling / 0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: NWTPHDX_S

Sample ID	LCS	SampType	: LCS	TestCod	de: NWTPHD	K_S Units: mg/Kg		Prep Da	te: 10/11/	2004	Run ID: G	C-M_041011	В
Client ID:	ZZZZZ	Batch ID	11989	TestN	lo: NWTPH-D	x		Analysis Da	te: 10/11/	2004	SeqNo: 28	33246	
Analyte			Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel			160	15.0	167.6	0	95.4	76.3	122	0	0		-
Lube Oil	1		183.8	50.0	167.6	0	110	69.9	127	0	0		
Sample ID	0409129	06ADUP SampType	: DUP	TestCod	de: NV/TPHD	K_S Units: mg/Kg	-dry	Prep Da	te: 10/4/2	004	Run ID: G	C-M_041005	A
Client ID:	SD-12	Batch ID	11945	TestN	lo: NWTPH-D	×		Analysis Da	ite: 10/5/2	004	SeqNo: 2	81976	
Analyte	l :		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel			14.91	25.6	0	0	0	0	0	43.96	0	20	J
Lube Oil			83.32	85.3	0	0	0	0	0	145.7	0	20	J
Sample ID	0410009	06ADUP SampType	e: DUP	TestCod	de: NWTPHD	X_S Units: mg/Kg	-dry	Prep Da	te: 10/11/	2004	Run ID: G	C-M_041011	В
Client ID:	ZZZZZ	Batch ID	: 11989	TestN	lo: NWTPH-D	x		Analysis Da	ite: 10/11/	2004	SeqNo: 2	83250	
Analyte			Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel			ND	21.2	0	0	0	0	0	0	0		
Lube Oil			ND	70.8	0	0	0	0	0	0	0	20	
Sample ID	ccv	SampType	e: CCV	TestCod	de: NWTPHD	X_S Units: mg/Kg		Prep Da	te:		RuntD: G	C-M_041005	A
Client ID:	ZZZZZ	Batch ID	: 11945	TestN	No: NWTPH-D)x ,		Analysis Da	ite: 10/5/2	004	SeqNo: 2	81960	
Analyte			Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel			683.8	15.0	667.9	0	102	85	115	0	O	1	
Lube Oil			324.1	50.0	339.3	0	95.5	85	115	0	0	• 	
Sample ID	CCV	SampType	e: CCV	TestCod	de: NWTPHD	X_S Units: mg/Kg		Prep Da	te:		Run ID: G	C-M_041005	A
Client ID:	ZZZZZ	Batch ID	: 11945	Test	No: NWTPH- E)x		Analysis Da	ate: 10/5/2	004	SeqNo: 2	81978	
Analyte			Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel	!		667.2	15.0	667.9	0	99.9	85	115	0	C)	
Lube Oil			317.1	50.0	339.3	0	93.5	85	115	0	C	1	

Oualifiers:

ND - Not Detected at the Reporting Limit

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S - Spike Recovery outside accepted recovery limits

B - Analyte detected in the associated Method Blan

J Analyte detected below quantitation limits

R - RPD outside accepted recovery limits

Maul, Foster & Alongi

WorkOrder:

0409129

Project:

Hendren Sediment Sampling / 0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: NWTPHDX_S

Sample ID	CCV	SampType:	CCV	TestCod	e: NWTPHD	K_S Units: mg/Kg		Prep Da	te:		Run ID: G	C-M_041006	A
Client ID:	ZZZZZ	Batch ID:	11945	TestN	lo: NWTPH-D	x		Analysis Da	ite: 10/6/20	004	SeqNo: 28	2370	
Analyte		•	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel			667.2	15.0	667.9	0	99.9	85	115	0	0		
Lube Oil		_	317.1	50.0	339.3	0	93.5	85	115	0	0		
Sample ID	CCV	SampType:	CCV	TestCod	le: NWTPHD	X_S Units: mg/Kg		Prep Da	te:		Run ID: G	C-M_041006	A
Client ID:	ZZZZZ	Batch ID:	11945	TestN	lo: NWTPH- D	×		Analysis Da	ate: 10/6/2	004	SeqNo: 28	32372	
Analyte			Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel			676.9	15.0	667.9	0	101	85	115	0	0		
Lube Oil			316	50.0	339.3	0	93.1	85	115	0	0		<u>-</u>
Sample ID	CCV	SampType:	CCV	TestCoo	le: NWTPHD	X_S Units: mg/Kg		Prep Da	ite:		Run ID: G	C-M_041011	В
Sample ID Client ID:	CCV ZZZZZ	SampType: Batch ID:			de: NWTPHD do: NWTPH-D			•	ite: ate: 10/11/	2004	RunID: G SeqNo: 28	-	В
-					lo: NWTPH- C		%REC	Analysis Da	ate: 10/11 /	2004 RPD Ref Val		-	B Qual
Client ID:			11989	TestN	lo: NWTPH- C	SPK Ref Val		Analysis Da	ate: 10/11 /		SeqNo: 28 %RPD 0	33247 RPDLimit	
Client ID: Analyte			11989 Result	TestN PQL	lo: NWTPH- D	SPK Ref Val	%REC	Analysis Da	ate: 10/11/ HighLimit	RPD Ref Val	SeqNo: 28 %RPD	33247 RPDLimit	
Client ID: Analyte Diesel Lube Oil	ZZZZZ		11989 Result 324.1 257.5	TestN PQL 15.0 50.0	SPK value 334 251.3	SPK Ref Val	%REC 97.1 102	Analysis Da LowLimit 85	HighLimit 115 115	RPD Ref Val	SeqNo: 28 %RPD 0 0	33247 RPDLimit	Qual
Client ID: Analyte Diesel	ZZZZZ	Batch ID:	11989 Result 324.1 257.5	PQL 15.0 50.0 TestCoo	SPK value 334 251.3	SPK Ref Val 0 0 0 X_S Units: mg/Kg	%REC 97.1 102	Analysis Da LowLimit 85 85 Prep Da	HighLimit 115 115	RPD Ref Val 0 0	SeqNo: 28 %RPD 0 0	RPDLimit C-M_041011	Qual
Client ID: Analyte Diesel Lube Oil Sample ID	ccv	Batch ID: SampType:	11989 Result 324.1 257.5	PQL 15.0 50.0 TestCoo	SPK value 334 251.3 de: NWTPHD No: NWTPH-E	SPK Ref Val 0 0 0 X_S Units: mg/Kg	%REC 97.1 102	Analysis Da LowLimit 85 85 Prep Da Analysis Da	HighLimit 115 115 ate: 10/11/	RPD Ref Val 0 0	SeqNo: 28 %RPD 0 0 Run ID: G	RPDLimit C-M_041011	Qual B
Client ID: Analyte Diesel Lube Oil Sample ID Client ID:	ccv	Batch ID: SampType:	11989 Result 324.1 257.5 CCV 11989	PQL 15.0 50.0 TestCoo	SPK value 334 251.3 de: NWTPHD No: NWTPH-E	SPK Ref Val 0 0 0 X_S Units: mg/Kg	%REC 97.1 102	Analysis Da LowLimit 85 85 Prep Da Analysis Da	HighLimit 115 115 ate: 10/11/	0 0 0 2004	SeqNo: 28	RPDLimit C-M_041011 33251 RPDLimit	Qual B
Client ID: Analyte Diesel Lube Oil Sample ID Client ID: Analyte	ccv	Batch ID: SampType:	11989 Result 324.1 257.5 CCV 11989 Result	TestN PQL 15.0 50.0 TestCoo TestN PQL	SPK value 334 251.3 de: NWTPHD No: NWTPH-E	SPK Ref Val 0 0 X_S Units: mg/Kg X_SPK Ref Val	%REC 97.1 102 %REC	Analysis Da LowLimit 85 85 Prep Da Analysis Da LowLimit	HighLimit 115 115 ate: 10/11/ HighLimit	RPD Ref Val 0 0 2004 RPD Ref Val	SeqNo: 28	RPDLimit C-M_041011 33251 RPDLimit	Qual

Oualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blan

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Maul, Foster & Alongi

Work Order:

0409129

Project:

Hendren Sediment Sampling / 0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: NWTPHGX_S

							·							
Sample ID	MBLK	S	ampType:	MBLK	TestCod	e: NWTPHG)	K_S Units: mg/Kg		Prep Date	: 10/4/20	04	Run ID: G	C-I_041004C	
Client ID:	ZZZZZ		Batch ID:	11953	TestN	o: NWTPH-G	×		Analysis Date	e: 10/4/20	04	SeqNo: 28	31680	
Analyte				Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline				ND	2.50									
Surr:4-Br	romofluoro	benzene		103.4	1.00	100	0	103	50	150	0	0		
Sample ID	LCS	S	SampType:	LCS	TestCod	e: NWTPHG	X_S Units: mg/Kg		Prep Date	: 10/4/20	004	Run ID: G	C-I_041004C	
Client ID:	ZZZZZ		Batch ID:	11953	TestN	o: NWTPH-G	ix		Analysis Date	e: 10/4/2 0	004	SeqNo: 28	31681	
Analyte				Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline				28.75	2.50	30	0	95.8	53.5	121	0	0		
Sample ID	0409129-0	1ADUP S	SampType:	DUP	TestCod	e: NWTPHG	X_S Units: mg/Kg	-dry	Prep Date	: 10/4/20	004	Run ID: G	C-I_041004C	
Client ID:	SD-7		Batch ID:	11953	TestN	o: NWTPH-G	ix		Analysis Date	e: 10/4/2 0	004	SeqNo: 28	81692	
Analyte				Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline				ND	4.20	0	0	0	0	0	0	0	20	
Sample ID	CCV	S	SampType:	ccv	TestCod	e: NWTPHG	X_S Units: mg/Kg		Prep Date	:		Run ID: G	C-I_041004C	
Client ID:	ZZZZZ		Batch ID:	11953	TestN	o: NWTPH-G	ix .		Analysis Date	e: 10/4/2 0	004	SeqNo: 2	81682	
Analyte				Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline				2465	2.50	2500	0	98.6	80	120	0	0		
Sample ID	ссу	S	SampType:	CCV	TestCod	e: NWTPHG	X_S Units: mg/Kg		Prep Date):		Run ID: G	C-I_041004C	
Client ID:	ZZZZZ		Batch ID:	11953	TestN	o: NWTPH-G	Sx		Analysis Date	e: 10/4/2 0	004	SeqNo: 2	81693	•
Analyte				Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline				2280	2.50	2500	0	91.2	80	120	0	0	1	

Oualifiers:

ND - Not Detected at the Reporting Limit

S - Spike Recovery outside accepted recovery limits

B - Analyte detected in the associated Method Blan

J - Analyte detected below quantitation limits

R - RPD outside accepted recovery limits

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Maul, Foster & Alongi

WorkOrder:

0409129

Project:

Hendren Sediment Sampling/0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: PAHLL_S

Sample ID MB-11952 Client ID: ZZZZZ	SampType: MBLK Batch ID: 11952		e: PAHLL_S o: 8270SIM	Units: µg/Kg		Prep Da Analysis Da			Run ID: 59 SeqNo: 28	73P_041005 1914	SB
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	6.67									
Acenaphthylene	ND	6.67									
Anthracene	0.6667	6.67									J
Benz(a)anthracene	0.6667	6.67									J
Benzo(a)pyrene	ND	6.67									
Benzo(b)fluoranthene	ND	6.67									
Benzo(g,h,i)perylene	ND	6.67									
Benzo(k)fluoranthene	ND	6.67									
Chrysene	ND	6.67									
Dibenz(a,h)anthracene	ND	6.67									
Fluoranthene	1.333	6.67									J
Fluorene	ND	6.67									
Indeno(1,2,3-cd)pyrene	ND	6.67									
Naphthalene	ND	6.67									
Phenanthrene	2	6.67									J
Pyrene	1.333	6.67									J
Surr: 2-Fluorobiphenyl	4971	0	6667	0	74.6	42.6	128	0	0		
Surr: Nitrobenzene-d5	5250	0	6667	. 0	78.7	21.7	155	0	0		
Surr:p-Terphenyl-d14	7549	0	6667	0 .	113	44.9	155	0	0		

Sample ID LCS-11952 Client ID: ZZZZZ			TestCode: PAHLL_S Units: µg/Kg TestNo: 8270SIM			Prep Dat Analysis Da		Run ID: 5973P_041005B SeqNo: 281915			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	123.3	6.67	166.7	0	74	39.6	95.8	0	0		
Benzo(g,h,i)perylene	152.7	6.67	166.7	0	91.6	49.7	115	0	0		
Chrysene	136.7	6.67	166.7	0	82	57.1	112	0	0		
Naphthalene	123.3	6.67	166.7	0	74	29.1	103	0	0		
Phenanthrene	131.3	6.67	166.7	2	77.6	48.4	105	0	0		
Pyrene	141.3	6.67	166.7	1.333	84	47.2	120	0	0		

Oualifiers:

ND - Not Detected at the Reporting Limit

S - Spike Recovery outside accepted recovery limits

B - Analyte detected in the associated Method Blan

J-Analyte detected below quantitation limits

R - RPD outside accepted recovery limits

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Maul, Foster & Alongi

WorkOrder:

0409129

Project:

Hendren Sediment Sampling/0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: PAHLL_S

Sample ID 0409129-01AMS Client ID: SD-7	SampType: MS Batch ID: 11952		le: PAHLL_S io: 8270SIM	Units: µg/Kg	•	Prep Date Analysis Date			Run ID: 59 SeqNo: 28	73P_041005 1920	В
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	257.7	11.2	280.1	145.7	40	33.7	107	0	0		
Benzo(g,h,i)perylene	735	11.2	280.1	788.8	-19.2	15	128	0	0		S
Chrysene	683.5	11.2	280.1	761.9	-28	37.5	125	0	0		S
Naphthalene	196.1	11.2	280.1	150.1	16.4	27.7	108	0	0		S
Phenanthrene	690.2	11.2	280.1	825.8	-48.4	20.2	139	0	0		s
Pyrene	1151	11.2	280.1	1684	-190	26.8	134	0	0		S
Sample ID 0409129-01AMSD	SampType: MSD	TestCod	le: PAHLL_S	Units: µg/Kg	dry	Prep Date	e: 10/4/20	004	Run ID: 59	73P_041005	В
Client ID: SD-7	Batch ID: 11952	TestN	lo: 8270SIM			Analysis Dat	e: 10/5/2 (004	SeqNo: 28	1921	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	311.5	11.2	280.1	145.7	59.2	33.7	107	257.7	18.9	20	
Benzo(g,h,i)perylene	574.8	11.2	280.1	788.8	-76.4	15	128	735	24.5	20	SR
Chrysene	595	11.2	280.1	761.9	-59.6	37.5	125	683.5	13.8	20	S
Naphthalene	182.6	11.2	280.1	150.1	11.6	27.7	108	196.1	7.10	20	S
Phenanthrene	686.8	11.2	280.1	825.8	-49.6	20.2	139	690.2	0.488	20	S
Pyrene	1052	11.2	280.1	1684	-226	26.8	134	1151	8.95	20	S
Sample ID CCV-11952	SampType: CCV	TestCoo	le: PAHLL_S	Units: µg/Kg		Prep Date) :		Run ID: 59	73P_041005	В
Client ID: ZZZZZ	Batch ID: 11952	TestN	lo: 8270SIM			Analysis Dat	e: 10/5/2 0	004	SeqNo: 28	1913	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	135.3	6.67	133.3	0	102	70	130	0	0		
Acenaphthylene	141.3	6.67	133.3	0	106	70	130	0	0		
Anthracene	136.7	6.67	133.3	0	103	70	130	0	0		
Benz(a)anthracene	143.3	6.67	133.3	0	108	70	130	0	0		
Benzo(a)pyrene	154	6.67	133.3	0	116	70	130	0	0		
Benzo(b)fluoranthene	152	6.67	133.3	0	114	70	130	0	0		
Benzo(g,h,i)perylene	144	6.67	133.3	0	108	70	130	0	0		
Benzo(k)fluoranthene	143.3	6.67	133.3	0	108	70	130	0	0		
Chrysene	125.3	6.67	133.3	0	94	70		0	0		

Oualifiers:

ND - Not Detected at the Reporting Limit

S - Spike Recovery outside accepted recovery limits

B - Analyte detected in the associated Method Blan

J Analyte detected below quantitation limits

R - RPD outside accepted recovery limits

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Maul, Foster & Alongi

Work Order:

0409129

Project:

Hendren Sediment Sampling/0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: PAHLL_S

Sample ID CCV-11952 Client ID: ZZZZZ	SampType: CCV Batch ID: 11952		de: PAHLL_S	Units: µg/Kg		Prep Da Analysis Da		004	Run ID: 5973P_041005B SeqNo: 281913		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibenz(a,h)anthracene	160.7	6.67	133.3	0	120	70	130	0	0		
Fluoranthene	147.3	6.67	133.3	0	110	70	130	0	0		
Fluorene	146.7	6.67	133.3	0	110	70	130	0	0		
Indeno(1,2,3-cd)pyrene	152.7	6.67	133.3	0	114	70	130	0	0		
Naphthalene	134.7	6.67	133.3	0	101	70	130	. 0	0		
Phenanthrene	133.3	6.67	133.3	0	100	70	130	0	0		
Pyrene	134.7	6.67	133.3	0	101	70	130	0	0		

S - Spike Recovery outside accepted recovery limits

B - Analyte detected in the associated Method Blan

Maul, Foster & Alongi

Work Order:

0409129

Project:

Hendren Sediment Sampling/0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: SOLIDS_PPM

Sample ID 0409129	01BDUP SampType:	DUP	TestCode	: SOLIDS_I	PP Units: %-wt		Prep Da	te:		Run ID: V	VETCHEM_04	1011B
Client ID: SD-7	Batch ID:	R32970	TestNo	: A2216			Analysis Da	ite: 10/11/	2004	SeqNo: 2	83469	
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Solids		52.09	0	0	0	0	0	0	55.72	6.73	3 20	

B - Analyte detected in the associated Method Blan

J Analyte detected below quantitation limits

Maul, Foster & Alongi

WorkOrder:

0409129

Project:

Hendren Sediment Sampling / 0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: TOC_S

Sample ID MBLK	SampType		TestCode: T		Units: mg/Kg		Prep Date				OC-APOLLO	_041019A
Client ID: ZZZZZ	Batch ID:	R33194	TestNo: S	SW9060			Analysis Date	e: 10/21/ 2	2004	SeqNo: 2	86510	
Analyte		Result	PQL SF	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon		84.09	100									J
Sample ID LCS	SampType	: LCS	TestCode: T	oc_s	Units: mg/Kg		Prep Date	e:		Run ID: T	OC-APOLLO	_041019A
Client ID: ZZZZZ	Batch ID:	R33194	TestNo: \$	SW9060			AnalysisDate	e: 10/21 /2	2004	SeqNo: 2	86509	
Analyte		Result	PQL SF	^P K value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon		1039	100	1001	84.09	95.4	80	120	0	()	
Sample ID 0409129 -	1BDUP SampType	: DUP	TestCode: 1	roc_s	Units: mg/Kg-	dry	Prep Date	: :		Run ID: 1	OC-APOLLO	_041019A
Client ID: SD-7	Batch ID:	R33194	TestNo: \$	SW9060			Analysis Date	e: 10/21/	2004	SeqNo: 2	86512	
Analyte		Result	PQL SF	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon		17820	1200	0	0	0	. 0	0	22020	21.	1 20	R
Sample ID CCV	SampType	: CCV	TestCode: 1	roc_s	Units: mg/Kg		Prep Date	: :		Run ID: 1	OC-APOLLO	_041019A
Client ID: ZZZZZ	Batch ID:	R33194	TestNo: \$	SW9060			Analysis Dat	e: 10/21/	2004	SeqNo: 2	.86514	
Analyte		Result	PQL SF	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon		1059	100	1001	0	106	90	110	0	(0	
Sample ID CCV	SampType	: CCV	TestCode: 1	roc_s	Units: mg/Kg		Prep Date	e:		Run ID: 1	OC-APOLLO	_041019A
Client ID: ZZZZZ	Batch ID:	R33194	TestNo: \$	SW9060			AnalysisDat	e: 10/23/	2004	SeqNo: 2	:86515	
Analyte		Result	PQL SF	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon		1026	100	1001	0	102	90	110	0	(0	
Sample ID CCV	SampType	CCV	TestCode: 1	roc_s	Units: mg/Kg		Prep Date	e:		Run ID: 1	roc-apollo	_041019A
Client ID: ZZZZZ	Batch ID:	R33194	TestNo: \$	SW9060			AnalysisDat	e: 10/23/	2004	SeqNo: 2	.86521	
Analyte		Result	PQL SF	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Oualifiers:

ND - Not Detected at the Reporting Limit

S - Spike Recovery outside accepted recovery limits

B - Analyte detected in the associated Method Blan

J Analyte detected below quantitation limits

R - RPD outside accepted recovery limits

Page 9 of 11

Maul, Foster & Alongi

Work Order:

0409129

Project:

Hendren Sediment Sampling / 0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: TOC_S

Comple ID CCV	ST COV	T10-1- TOO 0				 		D 10		0440401
Sample ID CCV	SampType: CCV	TestCode: TOC_S	Units: mg/Kg		Prep Dat	ie:		Run ID:	TOC-APOLLO	_041019A
Client ID: ZZZZZ	Batch ID: R33194	TestNo: SW9060			Analysis Da	te: 10/23/2	2004	SeqNo: 2	286521	
Analyte	Result	PQL SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPC) RPDLimit	Qual
Total Organic Carbon	948.9	100 100	0	94.8	90	110	0		0	

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

Maul, Foster & Alongi

WorkOrder:

0409129

Project:

Hendren Sediment Sampling/0100.01.01

ANALYTICAL QC SUMMARY REPORT

TestCode: VS_S

Sample ID 0409129-0 Client ID: SD-7	1BDUP	SampType: Batch ID:			100.0000. 10_0				te: te: 10/11/	Run ID: WETCHEM_041011C SeqNo: 283476			
Analyte			Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Vai	%RPD	RPDLimit	Qual
Volatile Solids			9.44	1.00	0	0	0	0	0	7.54	22.4	25	
Volatile Solids (% of T	otal Sample)	4.92	1.00	0	0	0	0	0	4.2	15.8	25	

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blan

KEY TO FLAGS

- A. This sample contains a Gasoline Range Organic not identified as a specific hydrocarbon product. The result was quantified against gasoline calibration standards.
- A1. This sample caontains a Diesel Range Organic not identified as a specific hydrocarbon product. The result was quantified against diesel calibration standards.
- A2. This sample contains a Lube Oil Range Organic not identified as a specific hydrocarbon product. The result was quantified against lube oil calibration standards.
- A3. Results determined to be Non-Detect based on hydrocarbon pattern recognition. The product was carry-over from another hydrocarbon type.
- B. The blank exhibited a positive result greater than the reporting limit for this compound.
- C. The result confirmed by secondary column or GC/MS analysis.
- CN. See Case Narrative
- CR. Result for this analyte maybe biased dur to interferences. Confirmation by GC/MS or other technique is recommended.
- D. Surrogate was diluted outside reporting range.
- E. Result exceeds the calibration range for this compound. The result should be concidered as estimate.
- F. The positive results for this hydrocarbon is due to single component contamination. The product does not match any hydrocarbon in the fuels library.
- G. Results may be biased high due to biogenic interferences. Clean-up is recommended.
- H. Sample was analyzed outside recommended holding times.
- HT. At clients request, sample was analyzed outside method recommended holding times.
- J. The result for this analyte is between the MDL and the PQL, and should be considered an estimated concentration.
- K. Diesel result is biased high due to amount of Oil contained in the sample.
- L. Diesel result is biased hight due to amount of Gasoline contained in the sample.
- M. Oil result is biased high due to amount of Diesel contained in the sample.
- MC. Sample concentration is greater than 4x the spiked value; the spike value is considered insignificant.
- MI. Result is outside control limits due to matrix interference.
- MSA. Value determined by Method of Standard Addition.
- N. Sample appears to contain biogenic material biasing quantification.
- O. Laboratory Control Standard (LCS) exceeded laboratory control limits, but meets CCV criteria. Data meets EPA requirements.
- P. Detection levels of Methylene Chloride may be due to laboratory contamination, due to previous analysis or background levels.
- Q. Detection levels elevated due to sample matrix.
- R. RPD control limits were exceeded.
- RF. Duplicate failed due to result being at or near method reporting limit.
- RP. Matrix spike values exceed established QC limits, post digestion spike is in control.
- S. Recovery is outside control limits.
- *. The result for this parameter was greater than the maximum contaminant level or the TCLP regulatory limit.

Rev. October 23, 2001

CHAIN OF CUSTODY RECORD

MISS TO

Analyses

For Laboratory Use

	M	1//	/
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Date

912,8/04

Relinquished By:

Copies: White-Original

Company:

Time

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MFA

1976 S.W. 95th Place Tualatin, OR 97062 (503) 612-9007 - Phone (503) 612-8572 - Fax

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Unless Reclaimed, Samples Will Be Disposed of 60 Days After Receipt.

Sample I.D.

Date

925/04

Yellow-Project File

Time 1458

Company:

Pink-Customer Copy

Contact Person/Project	t Manager ANNA ST JOHN
	UL FORTEL & ALCHOT
Address	
	14, 2139 Fax
Project No. 6100	A e A St John P.O. NO.
Invoice To Mf	A & A St Tolan Sampling

Lab Job No.

Shipped Via_ Air Bill No.

	No. of Cor	PA:US (82	Vegewetim	4) State	WWTPH-D)	NWTHH-C	iolatileso	Istal sol	itetal ove	Grain Sig		Temperature On Receip Specialty Analytical Col Specialty Analytical Trip	ntainers? Y	/ N
Matrix	•	3	7				1	3	- Jane	1,5,51		Comments		Lab I.D.
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CHAIN OF CUSTODY RECORD

Page	ĺ	of	1
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Specialty Analytical

19761 S.W. 95th Place Tualatin, OR 97062 (503) 612-9007 - Phone (503) 612-8572 - Fax

ANNA ST TO HO

Specify Rush Analyses Must Be Scheduled With The Lab In Advance

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50-8 50-9

50-10 50-11 50-12

Unless Reclaimed, Samples Will Be Disposed of 50 Days After Receipt

Sample I.D.

Date

Yellow-Project File

Time

9125/04 1458

		Addres	s	1.5.	<i>(</i>	Z. t	39	Fax ect Name Hondy Tokin P.O. 1		
		<u> </u>	An	alvses					oratory Use	1
No of Containers	PAUS (8270 SIM	and the second s	WIPE OX	Volethiesolids (TVS)	Taka salàs	Tetal organic cart	Cowan Star (Gleva	Shipned Via. Air Bill No. Temperature On Rece Specialty Analytical C Specialty Analytical T	// E.M.F. eipt <u>5.68</u> 0 ontainers? Y	C N
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3 1000			X		X	X	X			
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CLIENT: Maul, Foster & A Project: Hendren Sedimen	Nongi t Sampling / 0100.	01.01		Lab Order: 0409129			
Lab ID: 0409129-03			(Collection Date:	9/28/20	04 11:10:00 AM	
Client Sample ID: SD-9				Matrix:	SEDIM	MENT	
Analyses	Result	Limit	Qual	Units	DF	Date Analyzed	
NWTPH-DX		NWTPH-DX				Analyst: tlf	
Diesel	171	25.0	Α1	mg/Kg-dry	1	10/5/2004	
Lube Oil	296	83.2	A2	mg/Kg-dry	1	10/5/2004	
Surr: o-Terphenyl	86.1	50-150		%REC	1	10/5/2004	
NWTPH-GX		NWTPH-GX				Analyst: tlf	
Gasoline	39.8	4.16		mg/Kg-dry	1	10/4/2004	
Surr: 4-Bromofluorobenzene	113	50-150		%REC	1	10/4/2004	
PAH'S BY GC/MS-OARSIM		8270SIM				Analyst: bda	
Acenaphthene .	963	6.67		μg/Kg	1	10/5/2004 3:10:00 PM	
Acenaphthylene	179	6.67		μg/Kg	1	10/5/2004 3:10:00 PM	
Anthracene	975	6.67		μg/Kg	1	10/5/2004 3:10:00 PM	
Benz(a)anthracene	2480	PEC 133		µg/Kg	20	10/5/2004 8:21:00 PM	
Benzo(a)pyrene	39607	PEC 133		µg/Kg	20	10/5/2004 8:21:00 PM	
Benzo(b)fluoranthene	35207	PEC 133		μg/Kg	20	10/5/2004 8:21:00 PM	
Benzo(g,h,i)perylene	2830	133		μg/Kg	20	10/5/2004 8:21:00 PM	
Benzo(k)fluoranthene	819	6.67		μg/Kg	1	10/5/2004 3:10:00 PM	
Chrysene	2450	133		μg/Kg	20	10/5/2004 8:21:00 PM	
Dibenz(a,h)anthracene	.394	6.67		µg/Kg	1	10/5/2004 3:10:00 PM	
Fluoranthene	8490	133		μg/Kg	20	10/5/2004 8:21:00 PM	
Fluorene	800	6.67		μg/Kg	1	10/5/2004 3:10:00 PM	
Indeno(1,2,3-cd)pyrene	2090	133		μg/Kg	20	10/5/2004 8:21:00 PM	
Naphthalene	595	6.67		µg/Kg	1	10/5/2004 3:10:00 PM	
Phenanthrene	8110	133		µg/Kg	20	10/5/2004 8:21:00 PM	
Pyrene	9490	133		μg/Kg	20	10/5/2004 8:21:00 PM	
Surr: 2-Fluorobiphenyl	69.3	42.6-128		%REC	1	10/5/2004 3:10:00 PM	
Surr: Nitrobenzene-d5	73.9	21.7-155		%REC	1	10/5/2004 3:10:00 PM	
Surr: p-Terphenyl-d14	107	44.9-155		%REC	1	10/5/2004 3:10:00 PM	
PARTICAL SIZE DISTRIBUTION		D422				Analyst: sub	
Partical Size	See Sub Report				1	10/4/2004	
TOTAL SOLIDS		A2216				Analyst: are	
Total Solids	62.6	1.00		% - w t	1	10/7/2004	
VOLATILE SOLIDS IN SOLIDS		vss				Analyst: are	
Volatile Solids	6.82	1.00		% - w t	1	10/7/2004	
Volatile Solids (% of Total Sample)	4.27	1.00		% - w t	1	10/7/2004	

CLIENT: Maul, Foster & Project: Hendren Sedimer	Alongi nt Sampling / 0100	01.01		Lab Order: 0409129			
rroject. Hendren Sedimer	it Sampling / 0100	.01.01	· · · · · · · · · · · · · · · · · · ·				
Lab ID: 0409129-04			Collection Date	e: 9/28/20	04 12:24:00 PM		
Client Sample ID: SD-10			Matri	c: SEDIM	IENT		
Analyses	Result	Limit Ç	Qual Units	DF	Date Analyzed		
NWTPH-DX		NWTPH-DX			Analyst: tlf		
Diesel	335	23.6	mg/Kg-dry	1	10/5/2004		
Lube Oil	389	78.7	mg/Kg-dry	1	10/5/2004		
Surr: o-Terphenyl	96.4	50-150	%REC	1	10/5/2004		
NWTPH-GX		NWTPH-GX			Analyst: tlf		
Gasoline	65.3	3.94	mg/Kg-dry	1	10/4/2004		
Surr: 4-Bromofluorobenzene	111	50-150	%REC	1	10/4/2004		
PAH'S BY GC/MS-OARSIM		8270SIM			Analyst: bda		
Acenaphthene	2880	133	μg/Kg	20	10/5/2004 8:52:00 PM		
Acenaphthylene	323	6.67	μg/Kg	1	10/5/2004 3:41:00 PM		
Anthracene	6840	133	μg/Kg	20	10/5/2004 8:52:00 PM		
Benz(a)anthracene	62507	PEC 133	μg/Kg	20	10/5/2004 8:52:00 PM		
Benzo(a)pyrene	9270	133	μg/Kg	20	10/5/2004 8:52:00 PM		
Benzo(b)fluoranthene	.74307	√ 133	μg/Kg	20	10/5/2004 8:52:00 PM		
Benzo(g,h,i)perylene	6210	133	μg/Kg	20	10/5/2004 8:52:00 PM		
Benzo(k)fluoranthene	2230	133	μg/Kg	20	10/5/2004 8:52:00 PM		
Chrysene	4960	133	μg/Kg	20	10/5/2004 8:52:00 PM		
Dibenz(a,h)anthracene	7291	6.67	μg/Kg	1	10/5/2004 3:41:00 PM		
Fluoranthene	21000	133	μg/Kg	20	10/5/2004 8:52:00 PM		
Fluorene	3130	133	μg/Kg	20	10/5/2004 8:52:00 PM		
Indeno(1,2,3-cd)pyrene	4320	133	μg/Kg ·	20	10/5/2004 8:52:00 PM		
Naphthalene	530	6.67	μg/Kg	1	10/5/2004 3:41:00 PM		
Phenanthrene	22200	133	μg/Kg 	20	10/5/2004 8:52:00 PM		
Pyrene	26500	133	µg/Kg .	20	10/5/2004 8:52:00 PM		
Surr: 2-Fluorobiphenyl	67.9	42.6-128	%REC	1	10/5/2004 3:41:00 PM		
Surr: Nitrobenzene-d5	69.7 119	21.7-155 44.9-155	%REC	1 1	10/5/2004 3:41:00 PM		
Surr: p-Terphenyl-d14	119		%REC	1	10/5/2004 3:41:00 PM		
PARTICAL SIZE DISTRIBUTION		D422			Analyst: sub		
Partical Size	See Sub Report			1	10/4/2004		
TOTAL SOLIDS		A2216			Analyst: are		
Total Solids	54.9	1.00	% - w t	1	10/7/2004		
VOLATILE SOLIDS IN SOLIDS		VSS			Analyst: are		
Volatile Solids	10.7	1.00	% - w t	1	10/7/2004		
Volatile Solids (% of Total Sample)	5.88	1.00	% - w t	1	10/7/2004		

Date:

CLIENT:

Maul, Foster & Alongi

Project:

Hendren Sediment Sampling / 0100.01.01

Lab Order:

0409129

Analyses		Result	Limit	Qual	Units	DF	Date Analyze
Client Sample ID:	SD-7				Matrix	SEDIM	ENT
Lab ID:	0409129-01			(Collection Date	9/28/20	04 10:18:00 AM

Client Sample ID: SD-7	Matrix: SEDIMENT					
Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
NWTPH-DX		NWTPH-DX				Analyst: tif
Diesel	57.0	25.2	Α1	mg/Kg-dry	1	10/5/2004
Lube Oil	165	84.0	A2	mg/Kg-dry	1	10/5/2004
Surr: o-Terphenyl	102	50-150		%REC	1	10/5/2004
NWTPH-GX		NWTPH-GX				Analyst: tlf
Gasoline	ND	4.20		mg/Kg-dry	1	10/4/2004
Surr: 4-Bromofluorobenzene	99.4	50-150		%REC	1	10/4/2004
PAH'S BY GC/MS-OARSIM		8270SIM				Analyst: bda
Acenaphthene	86.7	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Acenaphthylene	66.7	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Anthracene	113	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Benz(a)anthracene	493	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Benzo(a)pyrene	734]	PEC 6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Benzo(b)fluoranthene	693	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Benzo(g,h,i)perylene	469	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Benzo(k)fluoranthene	219	6.67		μg/Kg	. 1	10/5/2004 6:17:00 PM
Chrysene	453	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Dibenz(a,h)anthracene	99.3	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Fluoranthene	973	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Fluorene	81.3	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Indeno(1,2,3-cd)pyrene	380	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Naphthalene	89.3	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Phenanthrene	491	6.67		µg/Kg	1	10/5/2004 6:17:00 PM
Pyrene	1000	6.67		μg/Kg	1	10/5/2004 6:17:00 PM
Surr: 2-Fluorobiphenyl	35.5	42.6-128	S	%REC	1	10/5/2004 6:17:00 PM
Surr: Nitrobenzene-d5	47.3	21.7-155		%REC	1	10/5/2004 6:17:00 PM
Surr: p-Terphenyl-d14	81.9	44.9-155		%REC	1	10/5/2004 6:17:00 PM
PARTICAL SIZE DISTRIBUTION		D422				Analyst: sub
Partical Size	See Sub Report				1	10/4/2004
TOTAL SOLIDS		A2216				Analyst: are
Total Solids	55.7			% - w t	1	10/11/2004
VOLATILE SOLIDS IN SOLIDS		VSS				Analyst: are
Volatile Solids	7.54	1.00		% - w t	1	10/11/2004
Volatile Solids (% of Total Sample)	4.20	1.00		% - w t	1	10/11/2004

CLIENT: Maul, Foster & Project: Hendren Sedime	Alongi nt Sampling / 0100	0.01.01		Lab Order: 0409129			
				C. II. d. D. d	0/20/200	4 10 52 00 414	
Lab ID: 0409129-02				Collection Date:		4 10:52:00 AM	
Client Sample ID: SD-8				Matrix:	SEDIM	ENT	
Analyses	Result	Limit	Qual	Units	DF	Date Analyzed	
NWTPH-DX		NWTPH-DX				Analyst: tlf	
Diesel	ND	27.3		mg/Kg-dry	1 `	10/5/2004	
Lube Oil	114	91.1	A2	mg/Kg-dry	1	10/5/2004	
Surr: o-Terphenyl	75.4	50-150		%REC	1	10/5/2004	
NWTPH-GX		NWTPH-GX				Analyst: tlf	
Gasoline	ND	4.55		mg/Kg-dry	1	10/4/2004	
Surr: 4-Bromofluorobenzene	105	50-150		%REC	1	10/4/2004	
PAH'S BY GC/MS-OARSIM		8270SIM				Analyst: bda	
Acenaphthene	32.7	6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Acenaphthylene	31.3	6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Anthracene	43.3	6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Benz(a)anthracene	222	6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Benzo(a)pyrene	337	Not 6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Benzo(b)fluoranthene	347	6.67		µg/Kg	1	10/5/2004 7:50:00 PM	
Benzo(g,h,i)perylene	203	6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Benzo(k)fluoranthene	111	6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Chrysene	199	6.67		µg/Kg	1	10/5/2004 7:50:00 PM	
Dibenz(a,h)anthracene	46.0	6.67		µg/Kg	1	10/5/2004 7:50:00 PM	
Fluoranthene	445	6.67		µg/Kg	1	10/5/2004 7:50:00 PM	
Fluorene	26.0	6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Indeno(1,2,3-cd)pyrene	167	6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Naphthalene	29.3	6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Phenanthrene	167	6.67		μg/Kg	1	10/5/2004 7:50:00 PM	
Pyrene	457	6.67		μg/Kg	1	. 10/5/2004 7:50:00 PM	
Surr: 2-Fluorobiphenyl	28.6	42.6-128	S	%REC	1	10/5/2004 7:50:00 PM	
Surr: Nitrobenzene-d5	49.4	21.7-155		%REC	1	10/5/2004 7:50:00 PM	
Surr: p-Terphenyl-d14	68.3	44.9-155		%REC	1	10/5/2004 7:50:00 PM	
PARTICAL SIZE DISTRIBUTION		D422				Analyst: sub	
Partical Size	See Sub Report				1	10/4/2004	
TOTAL SOLIDS		A2216				Analyst: are	
Total Solids	54.6			% - w t	1	10/11/2004	
VOLATILE SOLIDS IN SOLIDS		vss				Analyst: are	
Volatile Solids	6.44	1.00		% - w t	1	10/11/2004	
Volatile Solids (% of Total Sample)	3.51	1.00		% - w t	1	10/11/2004	

CLIENT: Maul, Foster & A Project: Hendren Sedimer	Alongi nt Sampling / 0100		Lab Order: 0409129			
	it Sattiphing 7 0100	5.01.01				
Lab ID: 0409129-05			Collection Da	ate: 9/28/200	04 12:46:00 PM	
Client Sample ID: SD-11			Mat	rix: SEDIM	IENT	
Analyses	Result	Limit (Qual Units	DF	Date Analyzed	
NWTPH-DX		NWTPH-DX			Analyst: tlf	
Diesel	128	24.5	mg/Kg-dry	1	10/5/2004	
Lube Oil	257	81.8	mg/Kg-dry	1	10/5/2004	
Surr: o-Terphenyl	105	50-150	%REC	1	10/5/2004	
NWTPH-GX		NWTPH-GX			Analyst: tlf	
Gasoline	29.9	4.09	mg/Kg-dry	1	10/4/2004	
Surr: 4-Bromofluorobenzene	107	50-150	%REC	1	10/4/2004	
PAH'S BY GC/MS-OARSIM		8270SIM			Analyst: bda	
Acenaphthene	421	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Acenaphthylene	105	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Anthracene	228	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Benz(a)anthracene	679	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Benzo(a)pyrene	1290	7 PEC 6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Benzo(b)fluoranthene	1070	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Benzo(g,h,i)perylene	1080	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Benzo(k)fluoranthene	333	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Chrysene	651	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Dibenz(a,h)anthracene	127	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Fluoranthene	2600	133	μg/Kg	20	10/5/2004 9:24:00 PM	
Fluorene	317	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Indeno(1,2,3-cd)pyrene	747	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Naphthalene	342	6.67	μg/Kg	1	10/5/2004 4:12:00 PM	
Phenanthrene	2150	133	μg/Kg	20	10/5/2004 9:24:00 PM	
Pyrene	3030	133	μg/Kg	20	10/5/2004 9:24:00 PM	
Surr: 2-Fluorobiphenyl	58.9	42.6-128	%REC	1	10/5/2004 4:12:00 PM	
Surr: Nitrobenzene-d5	61.6	21.7-155	%REC	1	10/5/2004 4:12:00 PM	
Surr: p-Terphenyl-d14	88.9	44.9-155	%REC	1	10/5/2004 4:12:00 PM	
PARTICAL SIZE DISTRIBUTION		D422			Analyst: sub	
Partical Size	See Sub Report			1	10/4/2004	
TOTAL SOLIDS	_	A2216	24		Analyst: are	
Total Solids	61.4	1.00	% - w t	1	10/7/2004	
VOLATILE SOLIDS IN SOLIDS		VSS			Analyst: are	
Volatile Solids	6.25	1.00	% - w t	1	10/7/2004	
Volatile Solids (% of Total Sample)	3.84	1.00	% - w t	1	10/7/2004	

CLIENT: Maul, Foster & Project: Hendren Sedime:	Alongi nt Sampling / 0100	0.01.01		La	ıb Order:	0409129
Lab ID: 0409129-06			(Collection Date:	9/28/2004	1:01:00 PM
Client Sample ID: SD-12				Matrix:	SEDIME	NT
Analyses	Result	Limit	Qual	Units	ÐF	Date Analyzed
NWTPH-DX		NWTPH-DX				Analyst: tlf
Diesel	ND	25.6		mg/Kg-dry	1	10/11/2004
Lube Oil	. ND	85.3		mg/Kg-dry	1	10/11/2004
Surr: o-Terphenyl	65.7	50-150		%REC	1	10/11/2004
NWTPH-GX		NWTPH-GX				Analyst: tif
Gasoline	7.94	4.27		mg/Kg-dry	1	10/4/2004
Surr: 4-Bromofluorobenzene	98.9	50-150		%REC	1	10/4/2004
PAH'S BY GC/MS-OARSIM		8270SIM				Analyst: bda
Acenaphthene	42.7	6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Acenaphthylene	26.7	6.67		µg/Kg	1	10/5/2004 4:43:00 PM
Anthracene	48.0	6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Benz(a)anthracene	278	6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Benzo(a)pyrene	343	7 Not 6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Benzo(b)fluoranthene	489	25C 6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Benzo(g,h,i)perylene	254	6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Benzo(k)fluoranthene	159	6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Chrysene	290	6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Dibenz(a,h)anthracene	74.0	6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Fluoranthene	553	6.67		µg/Kg	1	10/5/2004 4:43:00 PM
Fluorene	32.0	6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Indeno(1,2,3-cd)pyrene	219	6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Naphthalene	45.3	6.67		μg/Kg	1	10/5/2004 4:43:00 PM
Phenanthrene	231	6.67		µg/Kg	1	10/5/2004 4:43:00 PM
Pyrene	519	6.67		µg/Kg	1	10/5/2004 4:43:00 PM
Surr: 2-Fluorobiphenyl	59.7	42.6-128		%REC	1	10/5/2004 4:43:00 PM
Surr: Nitrobenzene-d5	57.9	21.7-155		%REC	1	10/5/2004 4:43:00 PM
Surr: p-Terphenyl-d14	92.8	44.9-155		%REC	1	10/5/2004 4:43:00 PM
PARTICAL SIZE DISTRIBUTION		D422				Analyst: sub
Partical Size	See Sub Report				1	10/4/2004
TOTAL SOLIDS	50.0	A2216		0/	4	Analyst: are
Total Solids	58.3	1.00		% - w t	1	10/7/2004
VOLATILE SOLIDS IN SOLIDS		VSS				Analyst: are
Volatile Solids	5.90	1.00		% - w t	1	10/7/2004
Volatile Solids (% of Total Sample)	3.44	1.00		% - w t	1	10/7/2004

Tigard, Oregon 97201 Phone (503) 684-3460 FAX (503) 684-0954 Salem, OR 97301 Plione (503) 589-1252 FAX (503) 589-1309 Pend, 0f1 97702 Phoes (541) 330-9155 EAX (541) 330-9155

October 8, 2004 T0404710.CTI

Specialty Analytical 19761 SW 95th Place Tualatin, OR 97062

Re

Specialty Analytical – 2004 Miscellaneous Percent Passing #200 Sieve Testing

Gentlemen:

As requested, Carlson Testing, Inc. has completed percent passing #200 sieve testing on a sample of mative sand/silty material sampled by your representative on October 1, 2004. Testing was completed on October 4, 2004. Following are the test results:

error gerrenge Armond (f. 1999) vil a	***************************************	AASHT	O 111: Per	cent Passing #20	0 Sieve	THE REPORT OF THE PROPERTY OF
Sample ID	Wet Weight (a)	Dry Weight (g)	% Moisture	Dry Weight Prior to Wash	Ory Weight (g) After Wash	% Passing #200 Sieve
SD #12	245.6	139.6	75.9	139,6	43.2	69.1
(A) #11	302.7	174.4	73.6	174.4	62.2	643
SD #10	314.7	184 3	70.8	184 3	76.7	58.4
SD#9	302.3	175.2	72,5	175.2	66.2	62.2
SD #8	337 3	169.4	99.1	169.4	43.6	74,3
SD #7	240.4	132.2	81.8	132.2	45.3	65.7

Our recents pertain to material tested/inspected only. Information contained herein is not to reproduce except in full, without prior authorization from this office.

If there are any further questions regarding this matter, please do not hesitate to contact this office

Respectfully submitted.

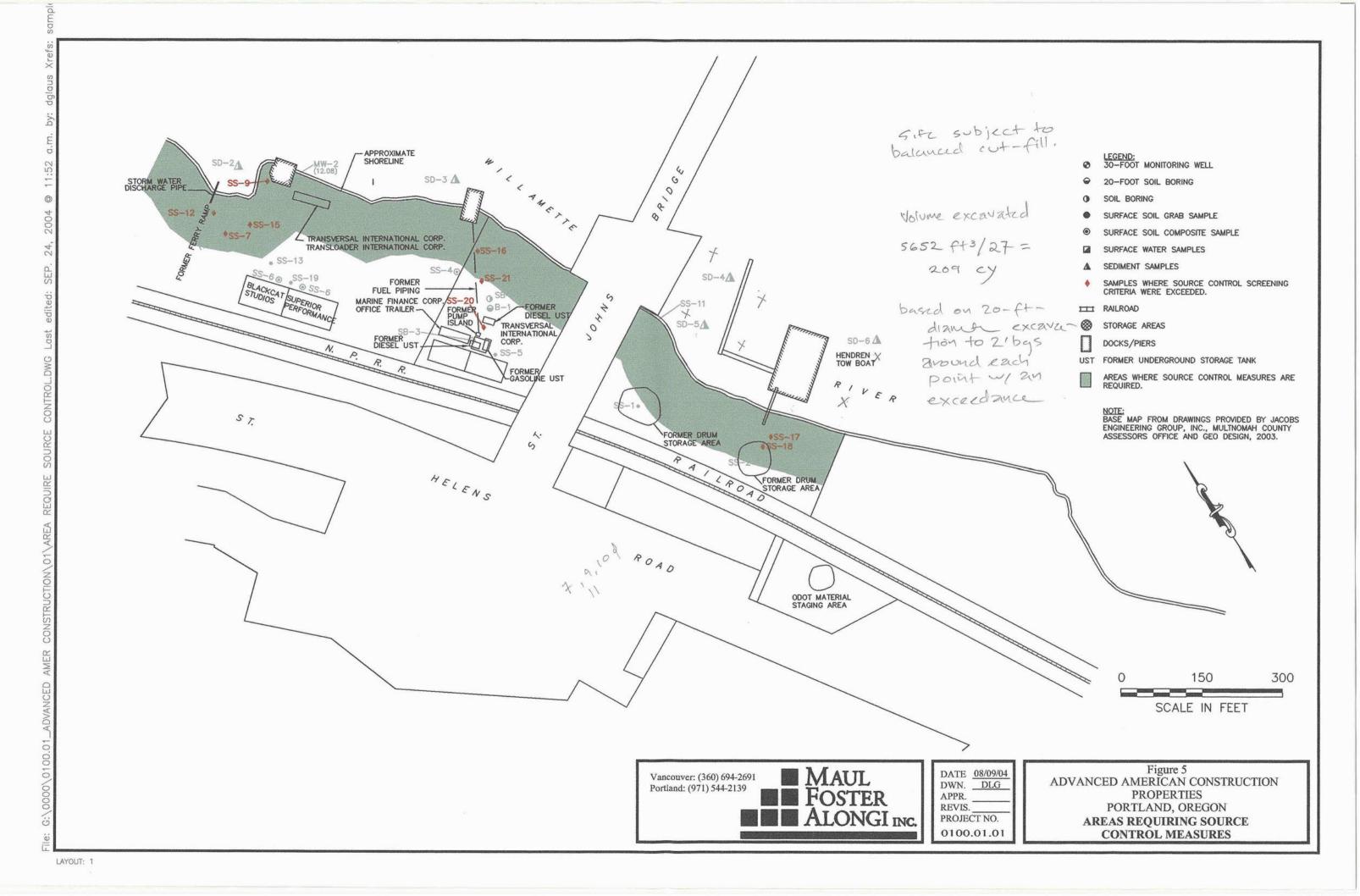
CARLSON TESTING INC.

Tw/Toller

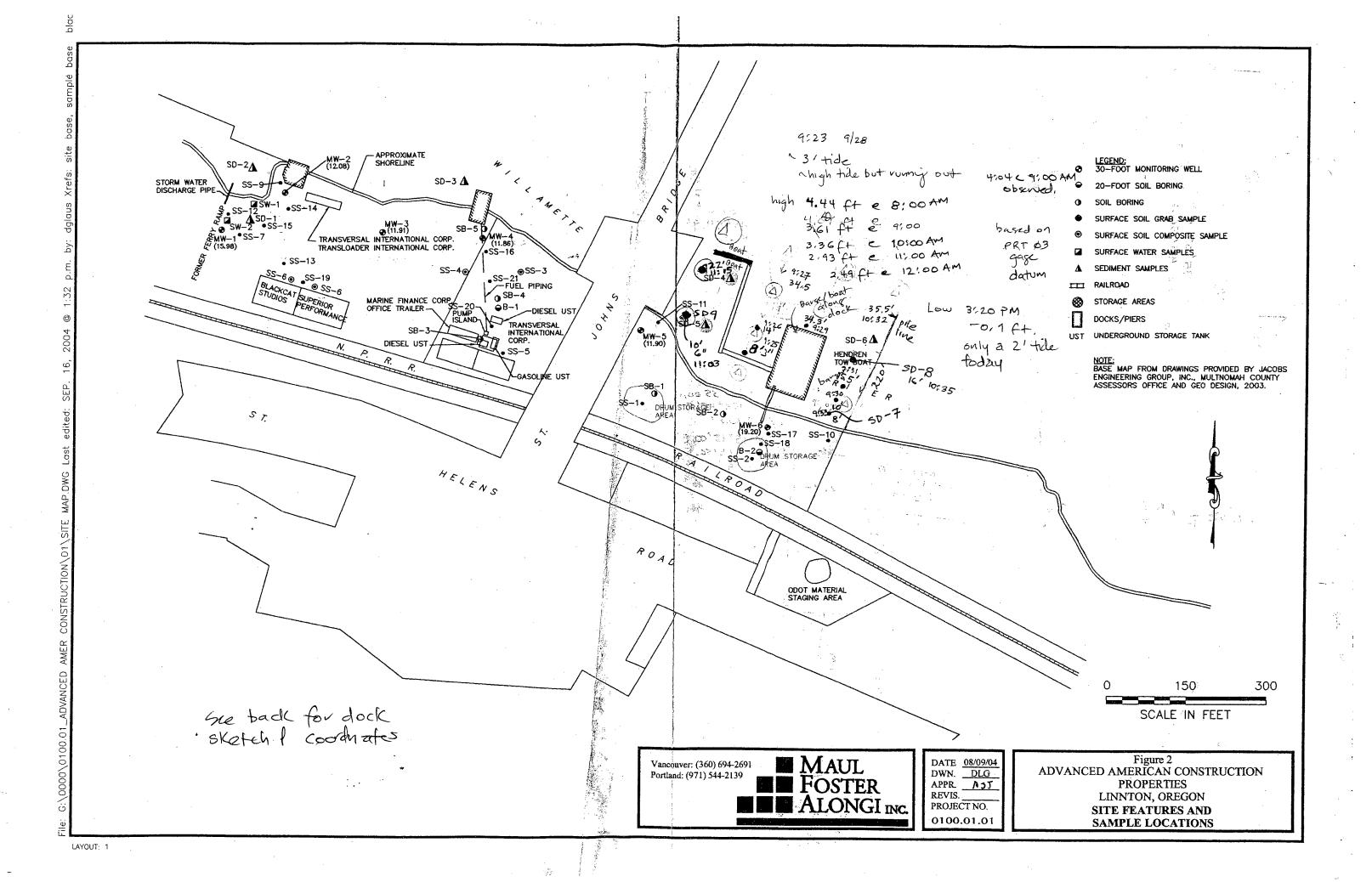
Assistant Laboratory Manager

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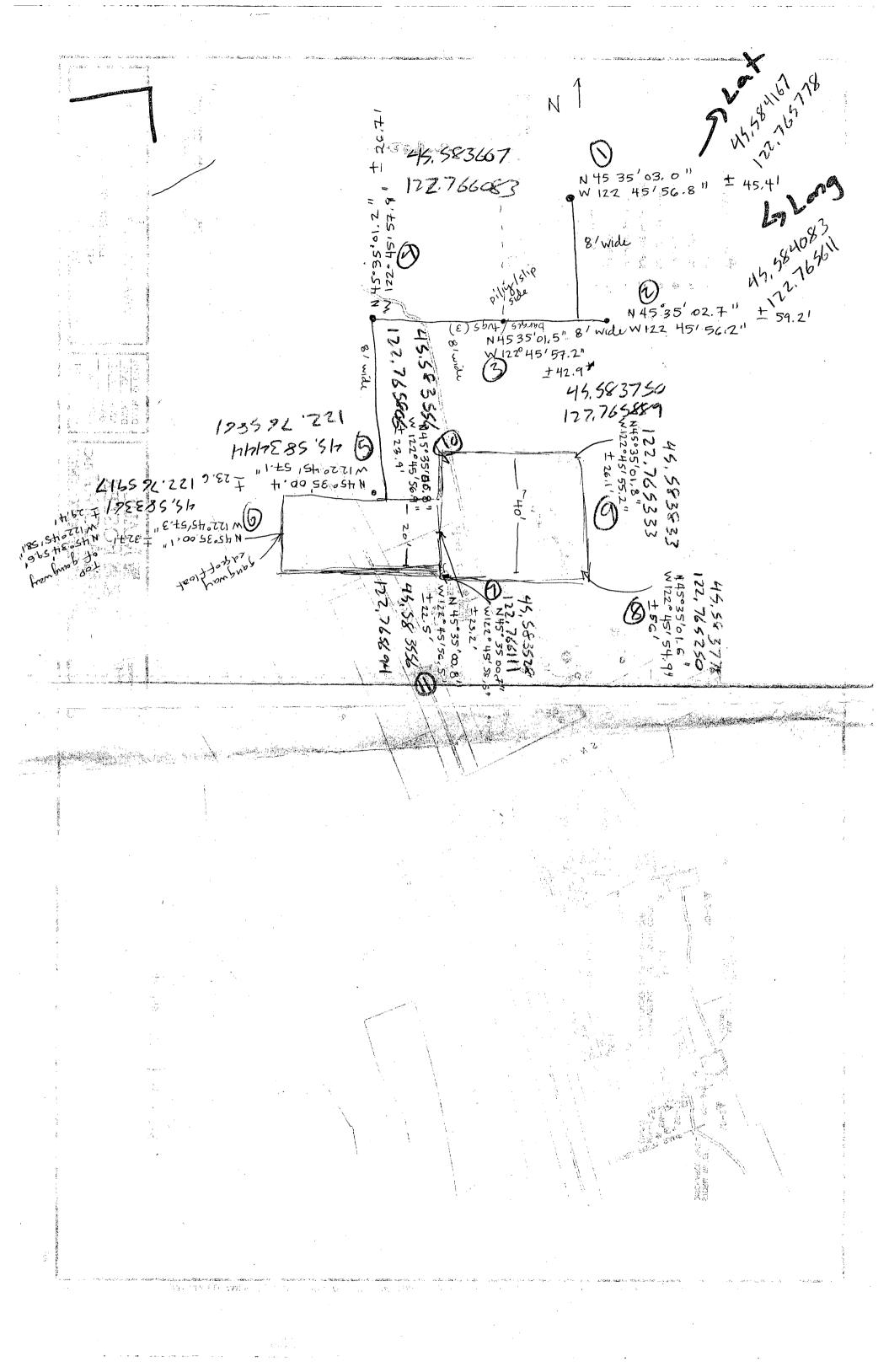
dk



AAC002929



AAC002930



DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

HENDREN TOW BOAT MARINE FINANCE CORPORATION PROPERTY SEDIMENT SAMPLING 0100.01.01

This report reviews the analytical results for groundwater samples collected in 2002 and 2004 by Maul Foster & Alongi, Inc. (MFA) at the Hendren Tow Boat site in Portland Oregon. Specialty Analytical in Tualatin, Oregon analyzed the samples. Specialty Analytical report number 0409129 was reviewed. The analyses performed are listed below.

Analysis	Reference		
Semivolatile Organic Compounds	USEPA 8270-SIM		
Gas Range Organics	NWTPH-Gx		
Diesel and Residual Range Organics	NWTPH-Dx		
Total & Volatile Solids	ASTM A2216		
Total Organic Carbon	USEPA 9060		

USEPA - U.S. Environmental Protection Agency

SIM - Selected Ion Monitoring

NWTPH - Northwest Total Petroleum Hydrocarbons

DATA QUALIFICATIONS

Analytical results were validated according to applicable portions of USEPA procedures (USEPA, 1994a, 1999), and appropriate laboratory and method-specific guidelines (CAS, 2004, USEPA, 1986).

All samples being analyzed for NWTPH-Dx, with concentrations above the MRLs, have been flagged with A1 or A2 flags. A1 represents a sample containing a Diesel Range Organic not identified as a specific hydrocarbon product. The result was quantified against diesel calibration standards. A2 represents a sample containing an Oil Range Organic not identified as a specific hydrocarbon product. The result was quantified against diesel calibration standards. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

Holding Times and Preservation

The samples were preserved appropriately. Extractions and analyses were performed within the recommended holding time criteria.

Blanks

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. No analytes were detected above the method reporting limits (MRLs) in the method blanks.

Trip Blanks

Trip blanks did not accompany the samples throughout collection, transit, and storage.

Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event. All samples were collected using dedicated single-use equipment.

Surrogate Recovery Results

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. The surrogate 2-Fluorobiphenyl used in the analysis of PAHs by 8270SIM was low for samples SD-7 and SD-8. The other two surrogates were within acceptable limits causing the laboratory to dismiss further action. All other surrogate percent recoveries were within Specialty Analytical acceptance limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results

MS/MSD results are used to evaluate laboratory precision and accuracy. All MS/MSD samples were extracted and analyzed at the required frequency. The MS/MSDs for the PAHs by 8270SIM had S flags (representing recovery outside control limits) for Benzo(g,h,I)perylene, Chrysene, Naphthalene, Phenanthrene, and Pyrene. The sample had hits for all of the compounds in the MS/MSD spike but the matrix interference caused the recoveries to be low. The LCS for the same analysis had acceptable recoveries illustrating accuracy. All recoveries and relative percent differences (RPDs) were within CAS acceptance limits.

Laboratory Control Sample (LCS) Results

LCS samples are spiked with target analytes to provide information on laboratory accuracy. All LCS samples were extracted and analyzed at the required frequency. All percent recoveries were within Specialty Analytical acceptance limits.

Laboratory Duplicates

A laboratory duplicate analysis provides information about laboratory precision. The laboratory duplicate for the analysis by 9060 (Total organic carbon) had a % RPD of 21.1%, just above the 20% limit established by the method. The laboratory considered this a minor and no further analysis was done. All other laboratory duplicate results were within RPD acceptance criteria.

Method Reporting Limits (MRLs)

Specialty Analytical used routine MRLs to quantify all results.

Calibration Range

All reported values were within calibration range.

Data Package

The data package was reviewed for transcription errors, omissions, or anomalies. Several omissions were found pertaining to the NWTPH-Dx samples. Samples SD-9 (0409129-03), SD-10 (0409129-04), SD-11 (0409129-05) had results that should have been flagged with A1, A2 flags depicting products quantified as diesel/oil even though the result is not identified as a specific hydrocarbon product. No other errors were noted.

REFERENCES

- SA (Specialty Analytical). 2004. *Quality Assurance Manual*. Specialty Analytical,, Tualatin, Oregon. January, 2004.
- USEPA (U.S. Environmental Protection Agency). 1986. Test methods for evaluating solid waste: physical/chemical methods. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. EPA-530/SW-846. September (update 1, July 1992; update 2a, August 1993; update 2, September 1994; update 2b, January 1995).
- USEPA (U.S. Environmental Protection Agency). 1994a. *USEPA contract laboratory program, national functional guidelines for inorganics data review*. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency. EPA 540/R-94/013. February.
- USEPA (U.S. Environmental Protection Agency). 1999. *USEPA contract laboratory program, national functional guidelines for organics data review.* Office of Emergency and Remedial Response, U.S. Environmental Protection Agency. EPA 540/R-94/012. February.

7223 NE Hazel Dell Avenue, Suite B, Vancouver, WA 98665 (360) 694-2691 Fax. (360) 906-1958

Soil Field Sampling Data Sheet

Client Name	Hendren	Sample Location Willamette River	
Project Number	0041.02.01	Sampler	Russ Banna & John Strand
Project Name	AACP	Sampling Date	09/28/2004
Sampling Event		Sample Name	SD-7
Sub Area		Sample Depth	2.5
FSDS QA:		Easting	Northing TOC

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(8) Other (Specify)	Sediment	Composite		10:18:00 AM	2 oz. soil	
					4 oz. soil	2
					8 oz. soil	1
					Other	
					Total Containers	3

Sample Description:	silty, dark gray

General Sampling Comments 5' a

5' acetate liner with 15' of rod to collect sample with sand catch.

N45°34'59.6" W122°45'56.6" accuracy 21.3'

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Hendren	Sample Location	Willamette River
Project Number	0041.02.01	Sampler	Russ Banna & John Strand
Project Name	AACP	Sampling Date	09/28/2004
Sampling Event		Sample Name	SD-8
Sub Area		Sample Depth	2.5
FSDS QA:		Easting	Northing TOC TOC

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(8) Other (Specify)	Sediment	Composite		10:52:00 AM	2 oz. soil	
		·			4 oz. soil	1
					8 oz. soil	1
					Other	
					Total Containers	2 .

	I otal Containers 2.	_
Sample Description:	silty, dark gray	
General Sampling Comments	5' acetate liner with 15' of rod to collect sample with sand catch. N45°35'00.4" W122°45'55.1"	

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Hendren	Sample Location	Willamette River
Project Number	0041.02.01	Sampler	Russ Banna & John Strand
Project Name	AACP	Sampling Date	09/28/2004
Sampling Event		Sample Name	SD-9
Sub Area		Sample Depth	2.5
FSDS QA:		Easting	Northing TOC

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(8) Other (Specify)	Sediment	Composite		11:10:00 AM	2 oz. soil	
			-		4 oz. soil	1
					8 oz. soil	1
					Other	
					Total Containers	2

silty, dark gray

General Sampling Comments

5' acetate liner with 15' of rod to collect sample with sand catch.

N45°35"02.9" (+-) 19.9-W122°45"58.4" (+-) 22.2"

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Hendren	Sample Location	Willamette River
Project Number	0041.02.01	Sampler	Russ Banna & John Strand
Project Name	AACP	Sampling Date	09/28/2004
Sampling Event		Sample Name	SD-10
Sub Area		Sample Depth	2.5
FSDS QA:		Easting	Northing TOC

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	# _
(8) Other (Specify)	Sediment	Composite		12:24:00 PM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	2
					Other	-
					Total Containers	3

silty, dark gray

General Sampling Comments

5' acetate liner with 15' of rod to collect sample with sand catch.

N45°35'02.5" (+-) 20-26 W122°45'57.6"

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Hendren	Sample Location	Willamette River
Project Number	0041.02.01	Sampler	Russ Banna & John Strand
Project Name	AACP	Sampling Date	09/28/2004
Sampling Event		Sample Name	SD-11
Sub Area		Sample Depth	2.5
FSDS QA:		Easting	Northing TOC TOC

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(8) Other (Specify)	Sediment	Composite		12:46:00 PM	2 oz. soil	
					4 oz. soil	1
	•				8 oz. soil	2
					Othér	
					Total Containers	3

silty, dark gray

General Sampling Comments

5' acetate liner with 15' of rod to collect sample with sand catch.

N45°35'02.0" (+-) 28.7' W122°45'56.7"

Sampling Method Code:

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

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Soil Field Sampling Data Sheet

Client Name	Hendren	Sample Location	Willamette River
Project Number	0041.02.01	Sampler	Russ Banna & John Strand
Project Name	AACP	Sampling Date	09/28/2004
Sampling Event		Sample Name	SD-12
Sub Area		Sample Depth	2.5
FSDS QA:		Easting	Northing TOC

Sample Information

Sampling Method	Sample Type	Sample Category	PID/FID	Sampling Time	Container Code	#
(8) Other (Specify)	Sediment	Composite		1:01:00 PM	2 oz. soil	
					4 oz. soil	1
					8 oz. soil	1
					Other	
					Total Containers	2

Sample Description:	silty, dark gray

General Sampling Comments

5' acetate liner with 15' of rod to collect sample with sand catch.

N45°35'01.0" (+-) 33' W122°45'57.3"

Sampling	Method	Code
----------	--------	------

(1) Backhoe, (2) Hand Auger, (3) Drill Bit Cutting Head, (4) Geoprobe, (5) Split Spoon, (6) Shelbey Tube, (7) Grab, (8) Other (Specify)

Signature			

Anna St. john

From:

Anna St. john

Sent:

Monday, November 14, 2005 1:06 PM

To: Cc: 'Scott Burgess' Anna St. john

Subject:

RE:

Hi Scott - Thanks for the reminder. I reviewed the ODOT submittal. I have a few questions/comments (of course).

- 1) Preconstruction and Corresponding Postconstruction/Confirmation Results. They noted that they collected confirmation samples from three locations where the highest contaminants were detected. This appears to be true for L-27-3 and SJB-LP-3, but I'm not sure which pre-construction locations the other two confirmation samples correspond to. Regarding the data, the lead concentration in SJB-LP-3 is higher than that in the preconstruction sample, L-27-3, suggesting impacts; both concentrations exceed the USEPA Region IX PRG based on direct contact for industrial workers. Ideally, this dirt should be removed, but is this area already capped? If yes, the exposure pathway has been eliminated. The diesel and heavy oil concentrations in the samples are below DEQ levels.
- 2) Map with Long Painting Sample Locations. Where are the Long Painting sample locations? I have an old fax from Long Painting with the locations, but it would be nice if ODOT included a map with these locations in its submittal or added it to the map with confirmation sample locations.

On another note, Dee and I talked about my coming out to the site for a short site tour Weds AM, Nov 16 after your site meeting and then my taking you two to lunch, maybe to Portland Brewing or ???? I was supposed to call and remind him about that today. Will that still work for you two? I'm in meetings until about 11:00, and then could swing by. Let me know if that works.

Anna Maria St. John, R.G.

Principal Hydrogeologist

Maul Foster & Alongi, Inc.

3121 SW Moody Ave., Suite 200

Portland, Oregon 97239

Telephone: (971) 544-2139

Cell: (b) (6)

Fax: (971) 544-2140

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modified, is prohibited without the express written consent of MFA.

----Original Message----

From: Scott Burgess [mailto:Scottb@aadiving.com]

Sent: Monday, November 14, 2005 9:35 AM

To: Anna St. john

Subject: FW:

Any information, yet? I heard thru Dee that you were back.

Scott A. Burgess, General Manager

Advanced American Construction, Inc. Advanced American Diving Service, Inc. M. Cutter Company 415 S. McLoughlin Boulevard (P.O. Box 1630) Oregon City, OR 97045 Tel: (503) 650-8207 Fax: (503) 650-8230

----Original Message----

From: Anna St. john [mailto:astjohn@mfainc.org]

Sent: Saturday, October 22, 2005 6:35 AM

To: Scott Burgess Subject: RIF:

www.aadiving.com

Hey Scott - I'll definitely review when I return on Nov 4. Unfortunately, I can't open the attachments remotely. Hope all is well! Anna

----Messaggio originale----

Da: Scott Burgess [mailto:Scottb@aadiving.com]

Inviato: ven 21/10/2005 10.40

A: Anna St. john

Cc:

Oggetto: FW:

Anna:

(b) (6)

Would you give a quick look at this information and see if you agree with Long's findings, i.e. "No Problem," at least from their presence at the site. We are holding their security deposit.

I have also attached your email RE pre-construction sampling.

Thanks,

Scott A. Burgess, General Manager

Advanced American Construction, Inc. Advanced American Diving Service, Inc. M. Cutter Company 415 S. McLoughlin Boulevard (P.O. Box 1630) Oregon City, OR 97045 Tel: (503) 650-8207 Fax: (503) 650-8230 www.aadiving.com ----Original Message-----

From: Doug Posner [mailto:Dougp@longpainting.com]

Sent: Friday, October 21, 2005 10:13 AM

To: Scott Burgess Cc: Alan Langer Subject: Fwd:

Scott.

In response to your letter of 30JUN05, the attached data is provided.

Thanx, Doug

>>> "WITTBRODT Paul R" <Paul.R.WITTBRODT@odot.state.or.us> 10/20/2005

3:21 PM >>>

Bill and Doug,

Attached are the files for the post-construction soil sampling on the west side of the Bridge.

<<Postconst sampling.doc>> <<Site Vicinity Map.doc>> <<CONFIRMATION
SAMPLING MAP.doc>> <<P4D0866.pdf>>
Hope you guys aren't overworking yourselves.

Let me know if there's anything else you need.

Paul R. Wittbrodt, Ph.D., R.G. Senior Hazardous Materials Specialist Oregon Department of Transportation 123 NW Flanders Portland, Oregon 97209 Phone (503) 731-3099 Cell (b)(6) Pager (b)(6) From: Anna St. john [astjohn@mfainc.org] Sent: Monday, December 13, 2004 4:24 PM

To: Scott Burgess

Cc: Ed Trompke; Carol Keddy; Anna St. john

Subject: Long Painting Samples, AACP ST. Johns Property

Hello Everyone:

I wanted to give everyone an update regarding the existence of baseline samples for Long Painting. I received some faxes from Sean Puryear in November with some data. I just spoke with Doug, a project manager with LP, for an explanation of the data. He noted that they collected samples under the St. Johns bridge in May 2003. Results (metals, PAHs, petroleum hydrocarbons, and herbicide and pesticides) do not exceed the source control screening criteria or human risk-based concentrations. Also, he noted that operations at the site have not included any lead work and only equipment storage and parking. We recommend that AACP request collection of samples in the same locations after their lease expires. I need to request a more legible copy of the baseline results from Doug/Sean and then they can be transmitted to you and the DEQ.

(b) (6)

Have a nice evening!

Anna St. John, R.G. Principal Hydrogeologist Maul Foster & Alongi, Inc. 3121 SW Moody Avenue, Ste. 200 Portland, Oregon 97239

Phone: 971-544-2139 or 800-896-4405 x 2113

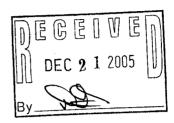
Fax: 971-544-2140

Cellular phone: (b) (6)

415 S. McLoughlin Boulevard P.O. Box 1630 Oregon City, Oregon 97045 Tel: (503) 650-8207 Fax: (503) 650-8230 www.aadiving.com







To:	Anna St. John	From:	Scott A. Burgess	
Fax:	(971) 544-2140	Pages:	6	
Phone:	(971) 544-2139	Date:	12/21/2005	
Re:	Long Painting Samples			
□ Urge	ent X For Review	☐ Please Comment	☐ Please Reply	☐ Please Recycle
Anna:				· .
	last, attached is what I got b who said: 938	eack from Long Painting in r	esponse to our reques	st of 11-15-05. I called Bill
•	SJB-LP-3 (post) correspond	is to L-27-2 (pre) las you que	-7 pv 28-8 {	Scaller 1 St.

• SJB-LP-2 (post) corresponds to L-27-6 OR L-27-8 (pre)! He couldn't say specifically.

148 Pb 137 Pb no such sample

SJB-LP-1 (post) corresponds to ("is close to") 13-0-1(pre). "Close" because they sampled on the centerline of the bridge (underneath) and ODOT sampled south of the bridge.

I don't know if this helps, i.e. is good enough information. I guess we look at worst case, e.g. comparing SJB-LP-2 to L-27-6 and to I-27-8, and if that is a violation they will have to do better or clean it up. That of course leads us to well, its capped anyway...

Happy Holidaze!

Pb prc = 800 ppm industrial Lowest dusc1 RBC = 23,000 ppm

LONG PAINTING / MARINE INDUSTRIAL

1		
H	Δ	X
. ■	T T	<u> </u>

Date: December 20, 2005

Number of pages including cover sheet: 5

	Advanced American Construction					
	407 500 000					
Phone;	503-650-8207					

	Long Painting Company
	St. Johns Bridge Project
Home:	
Phone:	253-23 4-8 0 9 6
ax phone:	253-234-0034

REMARKS:	Urgent	For your review	Reply ASAP	Please commont	

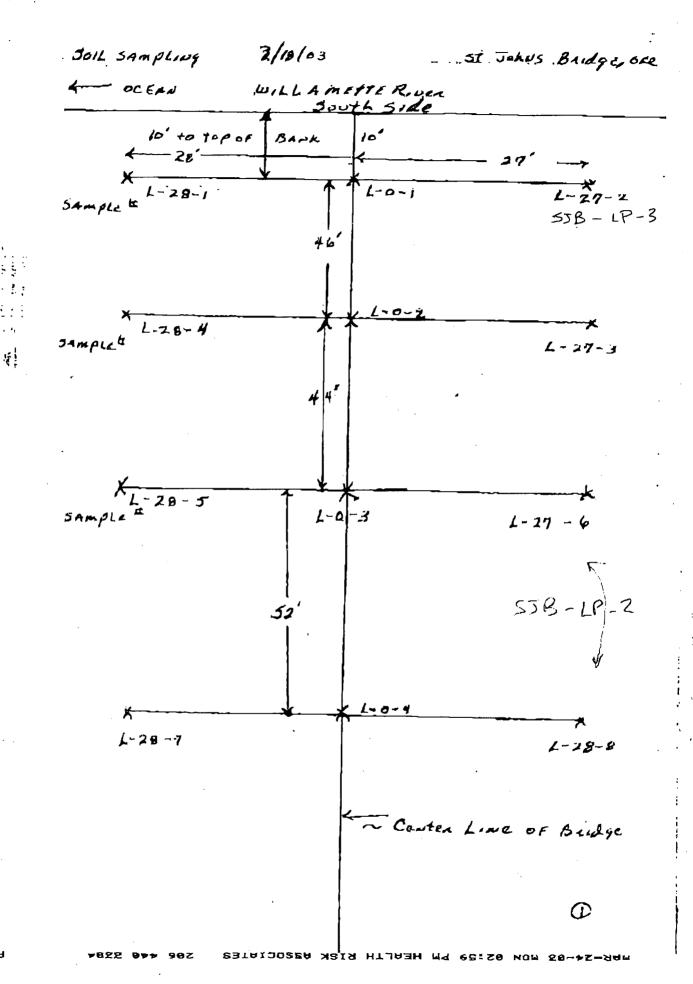
Scott,

Doug requested that I handle this matter (b) (6) have attached the pre-construction soil sample map locations, taken by Long Painting Company on March 18, 2003 as requested in your December 5, 2005 e-mail.

If I can be of any further assistance, please call me.

Bill

90'4



Except Center - INLINE WITH

PIER BEOCKS

LFT L 13-02

SAMPLE 13-0-1 Caster of SE Pri

Bridge

13-03 Rt IN FRANTS

PIER BLOCK

Looking at pick 13

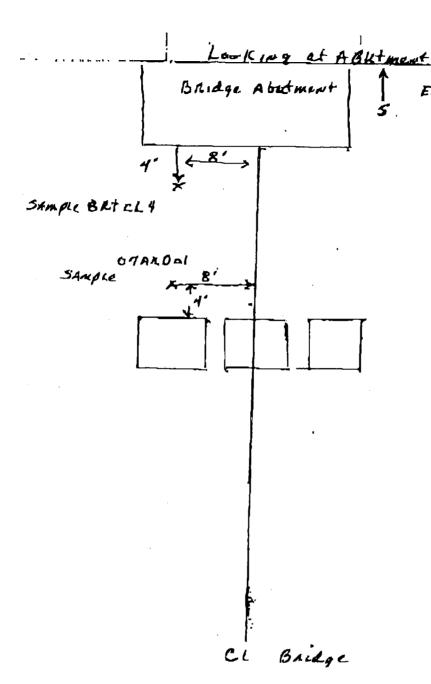
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1

253 234 0034 P.04

End of Bridge





·; -

SAMPLE 21116

SAMPLE 22'

SAMPLE 21116

SAMPLE TAKEN woder conve.

<u>A</u>

LAST PAGE

206 440 3394

HAR-24-83 HON 82:01 PM HEALTH RISK RSSUCIATES.

TOTAL P.05



FAX TRANSMITTAL

ENVIRONMENTAL & ENGINEERING CONSULTANTS
3121 SW Moody Avenue, Suite 200, Portland, Oregon 97239
Phone 971.544.2139 | Fax 971.544.2140 | www.MFAinc.org

То:	Scott Burgess;	DATE: 124106	
	AACP	FAX #: 503, 650 - 8230	
RE:	Long's Painty	PAGES: (7) INCLUDING COVER SHEET	_
FROM:	AST	, Maul Foster & Alongi, Inc.—Portland	

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COMMENTS:

Maul Foster & Alongi, Inc. provides private and public sector clients with high-quality, practical, solution-oriented environmental consulting and engineering services that are recognized by our clients for their quality, value, and merit.

- 🗯 Air Emissions Modeling
- Aquifer Testing and Well Design
- Brownfield Redevelopment
- Civil Engineering
- Construction Management and Inspection
- Corrective Action Plans
- Cost Analyses
- Data Management
- Environmental Management Systems
- Environmental Compliance Audits

- Expert Witness Testimony
- Feasibility Studies
- Geotechnical Engineering
- Groundwater Modeling and Monitoring
- Hydraulic, Geologic, and Hydrogeologic Assessments
- Permitting
- Prospective Purchaser Agreements
- Property Transaction Assessments
- Regulatory Agency Liaison
- Regulatory Support/Negotiation

- Regional Aquifer Protection and Planning
- Remedial Investigation
- Remediation System Design and Installation
- Remediation System Operation and Maintenance
- Risk Assessment
- E Risk Communication
- Site Grading and Paving
- Stormwater Detention and Treatment System Design
- Water Quality Assessment



Department of Transportation

Region 1 Geo/Hydro 123 NW Flanders Street Portland, OR 97209 (503) 731-3099 Fax (503) 731-8531

November 14, 2005

TECHNICAL MEMORANDUM

To:

Grea Gifford

Project Manager

From:

Paul Wittbrodt

Sr. HazMat Specialist

Subject:

Post-construction Soil Sampling Results

St. Johns Bridge

Highway 123 @ MP 0.57

Multnomah County

Key # 09393

INTRODUCTION

The supplemental special provisions for the St. John's Bridge contract document required that soil samples be collected and analyzed to establish pre-existing background levels of contaminants. Upon project completion, the sampling and testing is to be repeated to confirm that no contamination has occurred. The results of the post-construction investigation are discussed below.

BACKGROUND

Surface soil sampling was completed by the contractor under the west end of the St. Johns Bridge in March 2003 prior to the start of the bridge rehabilitation project. See Figure 1 for site location. The results of that investigation indicated that elevated levels of diesel and heavy oil range petroleum hydrocarbons, chromium and lead were present. Samples collected were analyzed for total lead but were not analyzed for leachable lead by Toxic Characteristic Leaching Procedure (TCLP) methods. Since those samples were collected at the surface, they would be expected to have high levels of total lead from bridge paint chips. A Preliminary Site Investigation (PSI) completed by Region 1 HazMat in June 2002 did not detect leachable metals above DEQ cleanup levels but did find heavy oil in samples from the upper three feet of soil at the site. During the bridge rehabilitation project, soil excavated from under the bridge for installations of a drain line was disposed at Hillsboro Landfill due the presence of contaminants.

SITE ASSESSMENT ACTIVITIES

Field investigation and sampling activities were completed by Paul Wittbrodt of Region 1 HazMat on 25 August 2005. Soil samples were collected from three locations where the highest levels of contaminants were detected in the pre-construction investigation. Sample locations are shown in Figure 2. Surface soils were broken with a pick and soil samples were collected between 6" and 12" below surface grade (bsg) using a hand auger. Samples were collected in 8 ounce laboratory jars and placed on ice for transport to North Creek Analytical Lab (NCA) in Beaverton, OR using chain-of-custody protocol. One soil sample was collected at each sampling location.

ANALYTICAL RESULTS

On 26 August 2005, Region 1 HazMat submitted three soil samples to NCA for analysis of total petroleum hydrocarbons – diesel extended (TPH-Dx) and total lead. Results of the analyses indicate that both TPH-Dx and total lead were detected at levels similar to the levels found in the pre-construction samples. The analytical results are summarized in attached Table 1. A copy of the laboratory report is attached.

CONCLUSIONS

ODOT Region 1 HazMat has completed post-construction soil sampling in the Long Painting staging area at the west end of the St. Johns Bridge. The purpose of this investigation was to determine if soil contamination had occurred due to construction activities. Based on the analytical results, soils at the Long Painting staging area have not been significantly impacted by the construction project.

REFERENCE

Preliminary Site Investigation, St. Johns Bridge. ODOT Region 1 HazMat Unit, Henry Schmidt author, June 2002.

If you have any questions or concerns regarding the above report, please call Paul Wittbrodt at 503-731-3099.

Table 1 Analytical Results St. Johns Bridge: Post-construction samples								
Sample ID	Date	NV	VTPH-Dx	Total Lead (EPA 6020)				
Sample 15	Collected	Diesel	Heavy oil	Total Leau (LFA 3020)				
ODOT Samples								
SJB-LP-1	8/25/05	123	397	465				
SJB-LP-2	8/25/05	119	431	148				
SJB-LP-3	8/25/05	138	539	938				
Long Painting Samples								
L-28-1	3/18/03	70.6	158	143				
L-27-2	3/18/03	62.3	353	149				
L-28-4	3/18/03	34.9	113	116				
L-27-3	3/18/03	296	953	2170				
L-28-5	3/18/03	118	242	347				
L-27-6	3/18/03	64.0	208	137				
L-28-7	3/18/03	236	477	241				
L-28-8	3/18/03	92.9	498	276				
13-0-1	3/18/03	NA	NA	127				
8RTCL4	3/18/03	NA	NA	164				
07ARD01	3/18/03	NA	NA	140				
01110	3/18/03	NA .	NA	198				

Notes:

Concentrations given as mg/kg NA = Not analyzed

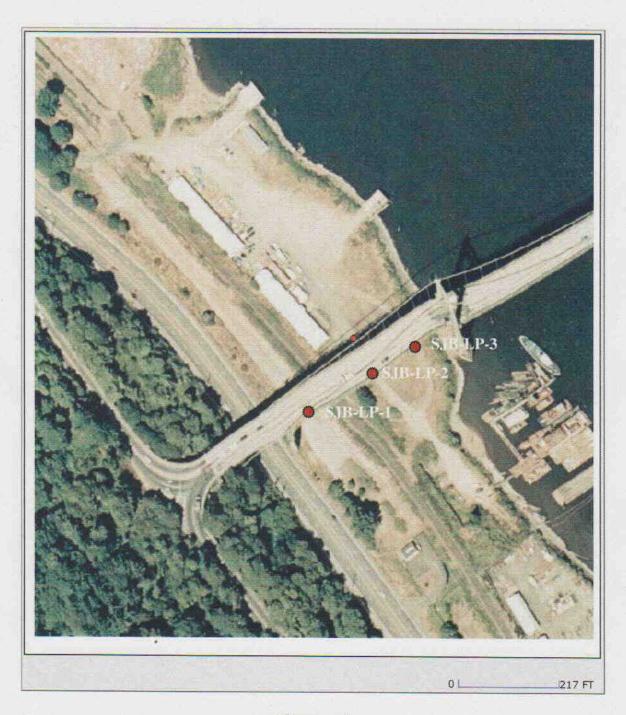


Figure 2
Sampling Locations
St. Johns Bridge

• = Sampling Locations



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223 425.420.9200 fax 425.420.9210

Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9200 fax 509.924.9290

Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210

Paral 20232 Empire Nume, Suite Ed. Rend, OR 07701-5711

Spokane

Portland

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

ODOT-MILWAUKIE

3700 SE 92nd

Project: St. Johns

Project Number: CON 01757

Reported:

Portland, OR 97266

Project Manager: Paul Wittbrodt

05/03/04 15:38

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SJB56W28S	P4D0866-01	Soil	04/22/04 10:30	04/23/04 11:00
SJBL8	P4D0866-02	Soil	04/22/04 11:30	04/23/04 11:00
SJBCurve7	P4D0866-03	Soil	04/22/04 11:45	04/23/04 11:00

North Creek Analytical - Portland

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its

Crystal Jones For Lisa Domenighini, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** Page 1 of 4



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-9223

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3700 SE 92nd

Portland, OR 97266

Project: St. Johns

Project Number: CON 01757 Project Manager: Paul Wittbrodt Reported:

05/03/04 15:38

TCLP Metals per EPA 1311/6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
SJB56W28S (P4D0866-01) Soil		Sampled: 04/22/04 Received: 04/23/04							
Chromium	0.00507	0.00500	mg/l	0.05	1311/6020	04/27/04	04/30/04	4041091	M-02
Lead	2.96	0.00500	"	**	"	"	"	н	M-02
SJBL8 (P4D0866-02) Soil		Sampled: 04/22/04 Received: 04/23/04							
Chromium	0.0149	0.00500	mg/l	0.05	1311/6020	04/27/04	04/30/04	4041091	M-02
Lead	1.16	0.00500	11	"	11	**	IF.	"	M-02
SJBCurve7 (P4D0866-03) Soil		Sampled: 04/22/04 Received: 04/23/04							
Chromium	ND	0.00500	mg/l	0.05	1311/6020	04/27/04	04/30/04	4041091	M-02
Lead	0.101	0.00500	11	**	"	н	11	II	M-02

North Creek Analytical - Portland

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Portland

ODOT-MILWAUKIE

Project: St. Johns

Reported:

Portland, OR 97266

3700 SE 92nd

Project Number: CON 01757 Project Manager: Paul Wittbrodt

05/03/04 15:38

TCLP Metals per EPA 1311/6000/7000 Series Methods - Quality Control

	No	rth Creek	Analyt	ical - Po	ortland					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4041091 - EPA 1311/3005										
Blank (4041091-BLK1)				Prepare	ed: 04/27/0	4 Analyz	ed: 04/30/0)4		
Chromium	ND	0.00500	mg/l							M-02
Lead '	ND	0.00500	11							M-02
LCS (4041091-BS1)		Prepare	ed: 04/27/0	4 Analyz	ed: 04/30/0)4				
Chromium	4.88	0.00500	mg/l	5.00		97.6	75-125		_	M-02
Lead	4.56	0.00500	11	5.00		91.2	75-125			M-02
LCS Dup (4041091-BSD1)				Prepared: 04/27/04 Analyzed: 04/30/04						
Chromium	4.82	0.00500	mg/l	5.00		96.4	75-125	1.24	20	M-02
Lead	4.51	0.00500	H	5.00		90.2	75-125	1.10	20	M-02
Matrix Spike (4041091-MS1)	Source: P4D0793-02			Prepare	ed: 04/27/0	4 Analyz	ed: 04/30/0)4		
Chromium	4.54	0.00500	mg/l	5.00	ND	90.8	50-150			M-02
Lead	4.24	0.00500	n	5.00	ND	84.8	50-150			M-02
Matrix Spike (4041091-MS2)	So	urce: P4D08	66-01	Prepare	ed: 04/27/0	4 Analyz	ed: 04/30/0)4		
Chromium	4.80	0.00500	mg/l	5.00	0.00507	95.9	50-150			M-02
Lead	7.46	0.00500	"	5.00	2.96	90.0	50-150			M-02

North Creek Analytical - Portland

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Crystal Jones For Lisa Domenighini, Project Manager

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Portland

509.924.9200 fax 509.924.9290 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210

20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588

ODOT-MILWAUKIE

3700 SE 92nd

Project: St. Johns

Project Number: CON 01757

Reported:

Portland, OR 97266

Project Manager: Paul Wittbrodt

05/03/04 15:38

Notes and Definitions

M-02 Analysis performed by EPA 200.7/6010 due to high analyte concentration or sample matrix interference.

DET

Analyte DETECTED

ND

Analyte NOT DETECTED at or above the reporting limit

NR

Not Reported

dry

Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.

wet

Sample results reported on a wet weight basis (as received)

RPD

Relative Percent Difference

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Crystal Jones For Lisa Domenighini, Project Manager

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St John's Bridge 8444 NW St, Helens Rd. Portland, OR 97210 Phone 503-286-6177 Fax. 503-286-3507

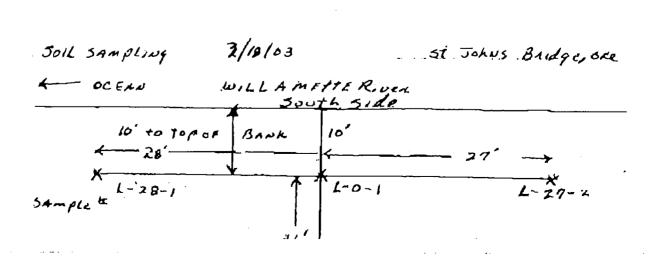
Long Painting Company

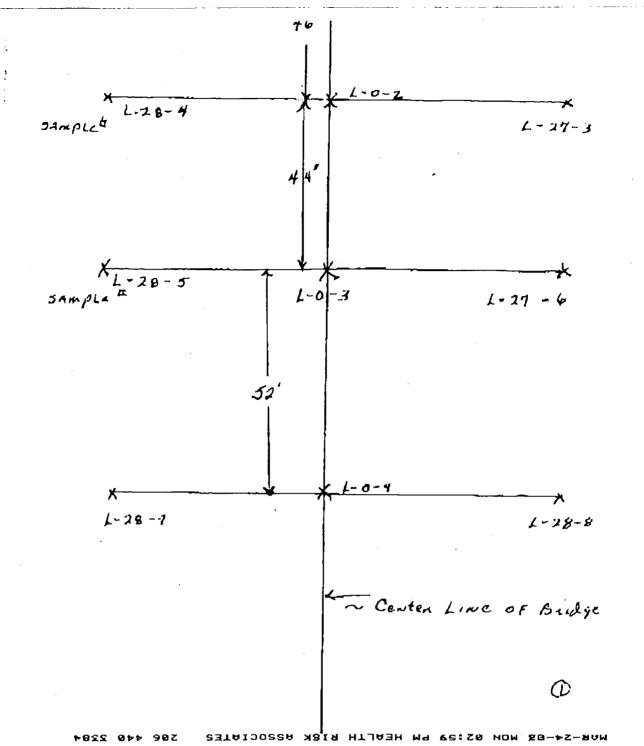
Fax

TO: ANNA ST. JOHN	From: SEAN P. PURYZAR
Fax:	Pages: \$ 5
Phone:	Date: 03 NOV 2004
Rc: Soil Sauples	CC:
🛘 Urgent 🗘 For Røviøw 🗘 Pla	aso Comment 🔲 Please Reply 🔲 Please Recycle
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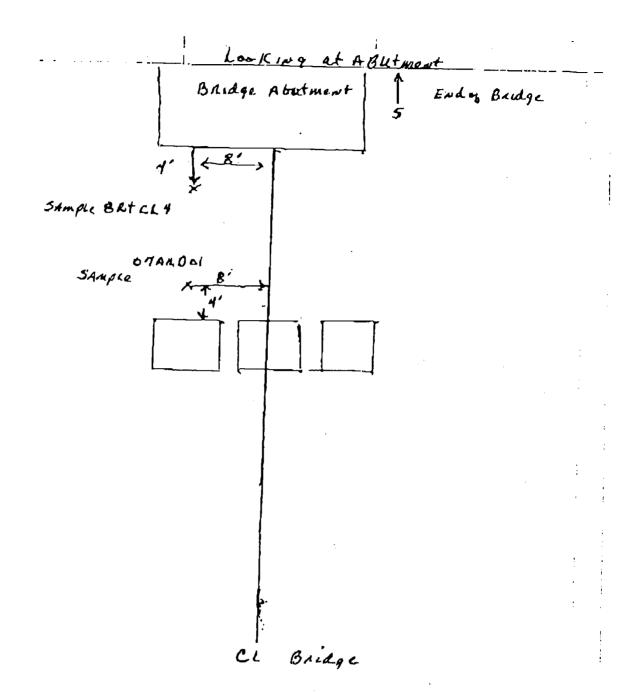
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LFT

1 13-02

SAMPLES TAKEN IN FRONT OF PIER BLOCKS Except center - INLINE with PIEKBEBCKS conten of 54mple 13-6-1 Budge IN FRONT OF PIER BLOCK 13-03 Rt IN MANTO PIER BLOCK

> Couter Line of Bridge Looking at pIER 13



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¿ Brain Ripe Wall Concrete SAMPLE 01116 SAMPLE TEKEN SAMPLE TAKEN Luder Conve

EM HEALTH RISK ASSOCIATES 10:50 HOM E0-≯2-98H St John's Bridge 8444 NW St. Helens Rd. Portland, OR 97210 Phone, 503-288-6177 Fax. 503-286-3507



Fax

TO: ANNA ST. JOHN	From: SEAN P. PURYEAR
Fax:	Pages: 🚱 D
Phone:	Date: 03 NOV 2-04
Ro: Soil Souples	CC ₇
☐ Urgent ☐ For Review ☐	Please Comment Please Reply Please Recycle
• Comments: ANU A	
4 FOUND THE RESI	ALTS FROM THE ORIGINAL
SAMPLES THREN.	I will sent in 3 pepts

STUGSELY



ODOT MII WAUKIE 3700 SP. 92nd

Preject. St Johns

Project Number: (*CIN 01757-011-G2)

KOWINE: 03/22/03 16:17

Portland, OK 97266 Project Manager Jenite Armstrong

Physical Parameters by APHA/ASTM/EPA Methods North Creek Analytical - Bothell

Analyte	Reguli	Reporting Lowit	Units	Dilution	Mnihed	Propared	Analyzed	Butch	Notes
SJB-1-9-9 (P3E0425-02) Soil					Sumpled 05	/13/0J Rea	rvcd: 05/14/	01	
□ry Weight	80.6	1 00	94		BSOPSPI 001				

North Creek Analytical - Portland

Lisa Domenighius, l'roject Managor

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> North Cines Activities, Inc. Environmental Laboratory Nathers

Page 7 of 24

Page 19



ODOT-MILWAUKIL Project. Sr Johns 1700 SE 92n4 Project Number CON 01757-011-G33

A sported:

Paritient, CR 97166 Project Manager Jenuis Armattang

100

U5/22/03 16:57

Physical Per ameters by APHA/ASTM/ERA Michods - Quality Control

North Greek Analytical - Bothell

		Reporting		Spike	Source		%RBC		KPD	
Analyte	Keeuli	1.lmlı	Unita	Level	Remit	%ŘLC	Limits	RPD	Limit	Notes

Batch 3E 16010 - Dry Weight

Dry Weight

Blank (\$E16010-DLK1) Prepared 05/16/03 Analyzeit 05/17/03

1 00

North Creek Analytical - Portland

Live Domenightni, Project Manager

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North Frock Apolytical, File Environmental Inholology Metwork

Page 19 of 24



ODOT-MILWAUKIP Project St Johns 3700 SE 93nd Project Number: CON 01757-611-023 Portland, OR 97266 Project Manague | Jennie Armetrong

Reported: 01/22/03 16:57

Percent Dry V			

North Creek Analytical - Portland									
Ansiriy	Rosult	Reporting Lings Units	Rpike Lirvel	Journa Kesuli	%REC	WPEC Limits	מאא	RPD Limit	Notes
Batch 3050610 - Dry Weight		•	_						
Duplicate (2050810 DU#1)	Sor	rner P3E0311-02	Propared	: 05/15/03	Andyze	d: 05/16/0	1		
% solids	E6 9	1 00% by Watght		16,1			0113	20	
Duplicata (3050610-DUP2)	Sou	rcec P3E0311-DE	Prepared	US/15/07	Anglyza	ed: 05/16/0	i		
% Souds	93.8	1 00% hy Walght		93.6			0 107	10	
Duplicate (5080818-DUP)	5ou	ron. P3E0311-07	Frepared	05/15/03	Analyzo	:d: 05/16/0	j		
M. Abstude	84.4	1.00% by Weight		84.7			0.355	20	
Pupilicate (3050610-DUP4)	Sour	CA: P3E0311-09	Prepared	03/15/00	Analyas	id. 03 71 6/ 0:	1		
% Solida	\$4.1	1 00% by Weight		84 U	<u> </u>		0.119	2.0	

North Creek Analytical - Portland

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Lisa Domenighmi, Project Managor

matin flerek Analytik pi, ina. Environmental Laboratory National Page 18 of 24

Brent Merwin - P3E0425 pdf



UDOT-MILWAUKIE

Project: St Julius

Project Number. CON 01757-041-G23

Reported:

Partiami, OR 97266

Project Manager: Jennie Aunacrong

05/22/03 16.57

Percent Dry Weight (Solids) per Standard Methods North Creek Analytical - Portland

Analyie	Acsult	Kupariing lama	Units	Dilutium	Method	Prepared	Analyzed	Datch	Notes
9JB-1-3-8 (PME0425-02) Soil		_			Sampled 05	/13/03 Reuc	nved: 01/14/0.	٠	
% Solide	78.9	1 00%	hy Weigh		NUA SOP	01/15/03		3030410	

North Creek Analytical - Postland

Lisa Domenighini, Project Manager

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Nurth Crack Analysical too Environmental (aboutly profesor) Page 6 0 (24



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475 470 9200 for 428,420 9210
Ipmann cast 1113 Hentgamary Sulfa B, Syukana, WA 99206 4776
TOP 924 9200 in a bus 0274 919 Syukana, WA 99206 4776
Welland 9405 EM Nimbira Bunnya, Basvareta, UR 9708-7157
(A) *** "HU, 9200 722 3603-925 9230
Wand 70117 Zimira Avanya, Sasvareta, UR 97701-3741
541 383,4310 May 541 107 7588

ODOT MILWAUKIE Poilland OR 97266

1700 SE 92nd

Project 51 Johns

Project Number: CON 01757-011-023

Project Manager Junius Armstrong

Reported:

05/22/03 16 57

Conventional Chemistry Parameters by APHA/EPA Methoda

North Creek Analytical - Spokane

Anulyti.	Requir	Reporting Land	Units	Ditutor	Mrihod	Prepared	Analyzed	Darch	Notes
SJB-1-8-6 (F1E0425-02) Soil					Sampled, 03	/13/03 Rece	lvcd: 05/14/L	د.	
% Solida	81.9	0.0100%	by Weigh	h1 1	Gravimorey	05/16/09	95/16/03	1050114	

North Creek Analytical - Portland

Lisa Domenighini, Project Manager

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Page 10 of 24



11770 North Crist, Pkwy N., Subs 400 Buches, WA 48011 9223 425 420 9200 fac 423.420 9220
Best 11115 Morrander, Suite B. Spekans, Wa 48186-6774 809-924 9200 745 509-924 922 828)
9465 SW Nichbus Avenue, Sdavamon, OR 47068-5172 9003 966 9706 fac 600 308-8711 100532 cmpler avenue Suits 6-1, 8-mid, OR 97701 \$711 \$741.281 9310 fav 744 303 7588

ODO)-MILWALIKIP J/00 SE 92nd

Project St Johna

Project Number CON 01757-011-6123

Reported:

Portland, OR 972ne

Project Manager Jannic Armstrong

05/22/03 16:47

Polynuclear Aromatic Compounds by GC/M 3 with Selected I on M onitoring

North Crook Analytical - Spokane

Analyte	Romir	Kepercing Land	Uniis	Dilution	Method	Prepared	Analyard	Baroh	Notes
SJB-1-9-9 (P3E0428-02) Soli				_	Sampled: 93/	unt Rece	ived 05/14/	03	
Naphdialana	ND	0.00	nig/kg dry	- 1	FPA 8270 nio	03/14/03	01/16/01	3050179	
Accouphthylene	ND	0 0100	•	-		b.	-	•	
A Cansuphithorie	0 0138	0.0100			•				
tluorens	ND	0 0 1 0 0	•		•			•	
Phonanthrone	0.125	0.00	•		•			8	
Anthracene	0,0244	9.0100	•						
Fluoranthene	0 154	0.0100							
Pyranu	0.238	0 0 1 00	-		a			,	
Benzo (4) Anthraonne	0,0977	0 0100		4	•				
Chrysone	0.111	0.0100			•	-		ч	
Senzo (b) fluoranthene	0.0757	0.0100			-				
Benzo (k) finoranthene	0.0708	0.0100		-	-				
Benzo (a) pyrene	0 105	0.0100							
Olbenzo (a,h) anthracene	0.0236	0.0100							
ndono (1,2,3-cd) pyren=	0 0716	0 0100		-					
Benzo (glii) perylene	0.102	0 0100		•	•			•	
Surr: Nitropenzene d5	78.4 %	30 8-110							
SUY, 2-FAP	65.6 %	27.1-135							
Purr. p-Terphenyl-d14	80.3 %	52 4-135						•	

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Lisa Domenighim, Project Manager

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> North Creat Analytical, Inc. Environmental Laboratory Nationes

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ODOT-MILWAUKIN 3700 QI: 92mJ

Project: St. Juhns

Project Number CON (11717-011-G2)

Reported;

Portland, OR 97266

Project Manager: Jonnie Arntationg

05/22/01 (6.57

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Mofiltoring Quality Control

North Creek Analytical - Spokane										
Analyte	Result	Reporting Lumb	Units	Spike Level	Source Result	MARC	KREC Limits	APD	KPD Limit	Naica
Bulch 3050129 - EPA 3660B										
Blank (3050129-BLK1)				Prepare	d: 05/11/0) Andy	cd 03/16/0))		-
Naphthalene	ND	0 0100	ing/kg							
Acceaphabylunu	МD	0.0100								
Avenaphiheno	ИŅ	0.0100	le .							
Fluorene	מא	0.0100	1							
Phonanthrone	ND	0.0100	•							
Anthracene	ND	0.0100	•							
Fluoranthene	ND	0 0100	•							
Pyrene	ND	0 0100	•							
Benzo (n) anthencens	ND	0.0100								
Chrysvan	ND	0 0100	•							
Benzo (b) flug(anthunu	NE	n 0100	-							
Renzo (k) fluoranthene	NO	0.0100	-							
Benzo (a) pyrcne	ND	0.0100	•							
Dalumau (a.h) anchraoche	עא	0.0100	•							
Indeno (1,2 3-cd) pyrono	ND	0 0100	-							
Acreo (ghi) perviene	ND	0.0100	•							
Ours: Hissoborman-dli	0 250		-	0 333		78.9	30 9-139			
Surr 2-FOF	0 232		-	0 133		dy. /	27 1 135			
Surr p-Terphenyl-d14	0 777		•	0 333		832	52 4-135			
LCS (3050129-BS1)				Prepared	1: 05/14/0	Analyza	»I 05/ 36/0	3		
Naphthal ent	0 119	0.0180	e/⊾e	0 167		/1.3	40 3-133			
Pluorena	0.133	0 0100	•	0 147		79.6	47.6-133			
Шітухайн	0 (21	0.0100	•	0.167			38.5-135			
nilano (1,2,3 cd) pyrens	0 107	0.0100		0 107			37 8-135			
Ourr Nitrobenzene-dS	0 293	_	•	0 133		WW D	30 9 139			
Surr. 2-FOP	0,279		•	0 33.7			27.1-135			
Pirr p-Terpnenyl-d14	0.203		•	0 333			52 4-135			

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Lisa Domenighini, Project Manager

NACIR Crook Abulutions Inc. Environmental Laboratory Normora Page 22 of 14



ODOT-MILWAUKII: 1700 SE 92nd

Project St Julius

Progree Number: CON 01757-011-G23

Reported;

Fortland, OR 97266

Project Managur. Jennie Armatrona

05/22/03 16 57

Folynuclear Aromatic Compounds by GCIM'S with Selected fon M calloring Quality Control

North Creek Analytical - Spokane										
Analyic	Regult	Kepofing Limit		Spike 1.cval	Source Result	%REC	KREC Limite	RID	KPO Lamit	Notes
Betch 3050129 - EPA 3650B								_		
M alzıs Spike (3050129-M S1)	50	urce: S3E0	090-01	Prenne	d 05/14&i	1 Annia	rcd: 05/16/0			
Naphihalenc	0.113	U. 0100	"Z"E dry	0 173	NU	63.1	46 3-135			
Floorung	0 121	0.0100		0 173	NU	69.9	47.6-135			
Chrysena	0 142	0.0100		U.171	0.0114	59.1	18.5-135			
Indano (1,2)-cd) pyrene	0.115	9 0100		U [73	ND	66.5	17 8-135			
Suff Nilli überinong-dif	0.278			0.345		80.6				
Dury Z.FMP	0,260			0.345		75 d	30, y-139			
Surr a-Terphonyl-d14	0.278		-	0 345		80 6	27.1-135 52 4-139			
4 atrix Spike Dup (3050129-M 8D1)	Sou	urce: SIE00	90.01	Prenanc	d- 05/14AI	4. Amelia	ed 01/16/0			
\nphchulene	0 117	0 0100	mg/kg dry	0.171	ND	67.6	163 135			
fluorene	0 128	0.0100	•	0.175	ND	74.U		1.48 .	25	
livy san w	0.155	0.0100	,	0 173	0 0104		47.6-135	5 62	25	
ndeno (1.2.3-ed) pyrane	0.119	0 0100		01/3	ND	66.8 68.8	38.5-135	8.75	25	
Mr. Nili alumano da	0 258				עא		17 A-135	3.42	25	
Durc 2-FBP	0 240		`.	0.345		74.2	30.0 139			
Rirr p-Terphenyl-d14				0.345			27.1-135			
The state of the s	0.268		-	0 345		27.4	52 4-135 ·			

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Lisa Domenighini, Project Muniger

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Byoman Cast Lillo Hentgemby Guite 8. Eyelyne, WA 98204-4774

you yee you'll are 500-81-9200

Partition 4 4405 CM Nominic Assentia, Researcher, UR 27008 7132

303-005-9200 fax 303-904-9210

Band 20312 Cmyley Arcius Buile F1. Bend, OR 97703-5713

341-283-3310 fax 541-282-7588

 ODOT-MILWAUKIR
 Project St. Johns

 3700 SE 92ml
 Project Number
 CON 01757-011-G23
 Reported:

 Project Number
 Linnix Armstrong
 05/22/01 16:57

Notes and Definitions

	TOTAL BUTTON
A-OF	Detected hydrounibus have distinct peaks that have cluston patterns similar to that of PAH's, as well as when extraneous peaks that may be due to biogenic interference
Q-02	The spike recurrery for this QC sample is outside of NCA established control limits thre to simply matrix unterfacence
Q-03	The RPD and/or percent recovery for this QC egike sample cannot be accurately calculated due to the high concentration of analyse already present or this analyse
Q-06	Analyses are not constrilled on RPD values from asympte concentrations less than 5 times the reporting timit
Q-07	The recovery of this spike is natural control limits due to sample dilution required from high unalyte consentation and/or matrix interforences.
O-07a	The RPD value for this QC sample is above the established control limit. Review of associated QC indicates the high RPD down mit represent an out-of-control condition for the batch
S.nı	The surrogate recovery for this sample is not available due to sample dilution required from high analyse concentration and/or matrix interfaces
DET	Analyte DPTPCTRO
ND	Analyte NOT DETECTED at or above the reporting limit
NK	Not Reported
dry	Sample results reputted us a dry weight basis. MRLs are adjusted if %Solids are less than 10%
wei	Smille results reported on a wet weight basis (as received)
RPD	Relative Percent Difference

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Lisa Domenighini, Project Manager

North Greek Analytical, I no Angironmunial Laboratory National Page 24 of 24

St. John's Bridge 6444 NW St. Helens Rd. Portland, OR 97210 Phone: 503-286-6177 Fax: 503-286-3507

Long Painting Company

Fax

TO: ANNA ST. JOHN	From: Sequ	P. PuryEAR
Fax:	Pages: /4	
Phone:	Date: 03 NOV 2	2004
RC: Soil Samples	CC:	
□ Urgent □ For Review □ !	Please Comment Please Re	ply Please Recycle
• Comments:		
4 FOND THE RESU	ICTS FROM THE I	PLIGIPHE
SAMPLES TAKEN		

SENIGHELY





Project: St. Johns ODOT-MILWAUKIE Project Number: CON 91757-011-G23 3700 SE 92nd

Reported:

Portland, OR 97266

Project Managur. Jennie Armstrong

05/22/01 16:57

Total Mictals per EPA 6000/7000 Series Minthods North Creek Analytical - Portland

Analyte	Resuli	Reporting	[laux	Dilgann	Merkod	Prepared	Annlyred	Ratek	Neses
5JB-1-5-9 (P3E0425-02) Soil					Sampled 057	13/03 Reac	ived: 05/14/	03	
Armenic	3.01	0.340	mg/kg dry	1	BPA 6010	05/14/05	05/19/03	1010110	
Barium	127	0.340	•	٠	•	•	05/15/03	-	
Cadmum	ND	0.140	•	•	•	•	•	•	
Chramium	127	0 3 1 0	•	•	•	-	•	•	
Lead	21.6	0,340		•	•	•	05/19/03		
Mercury	ND	0.0676	•	•	EFA 7471A	05/15/63	US/15/UJ	3050579	
Selenium	N·D	0.340	•		EPA KOZO	03/14/01	01/11/03	1010110	
Bilver	1.30	0.340	•	•	•	-	05/15/03	•	
8JB 1-9-10 (P3F0425-03) Water					Sampled 057	14/UI Kace	oved Unit 47	1)*1	
Cadmium	ND	0 00100	nı _i	t	CPA GD20	05/19/03	05/21/03	3050747	
Chromium	0 0205	0.00100		•	•	•	•	-	
L cad	0.301	0.00100	•		•		•	•	

North Creek Applytical - Pertland

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Lisa Dimenighini, Project Manager

North Croub Applyticus, sup Environmontal Laboratory notwork

Page 3 of 24



Surjets 1,720 North Crush Ptws M. Suto 400, Bethst. WA \$8031-0223 420-2200 7cm 423-420-2210 Spahane, WA \$9240 47/6 503-324-420 7cm 75-708-324-420
ODGI-MILWATIKIF 3700 SE 92nd

Project St Johns

Project Number: CON 01757-011-G2J

Reported:

Partland, OR 97266

Project Manager Jennie Armstrong

05/22/01 16:57

Total Matalagar EPA 5000/7000 Series Mathoda - Quality Control

	No	rth Creek	Analyi	tical - Pe	rtland					
Analyse	Result	Reporting Limit	Units	Spike Lovel	Source Result	KREC	MREC Limits	RPD	R CD Limit	Notes
Balch 3050550 - EPA 3050										
Mank (3050550-BL K1)				Propare	d & Analy	zed 01/1-	1/01			

0 500 0.100

ND

2Clastraut	ND	0.500			
Silvet	ND	0.300			
Blank (1040460-BL K 2)				Prepared & Analyzed, US/14/U3	
Araunic	טא	0.500	my/kg		
Barium	NU	0.500	•		
Carloman	מא	0 100	•		
Chromium	ND	0.300	•		
Lead	ND	0 100			
Selenium	ИÚ	0.500			

LC8 (3060659-831)				Prepared & /	analyzed 05/1	4/03	
Viscorio	¥.U5	0.150	mg/kg	9.01	l uu	An-120	
Salanum	8.76	0 450	•	101	77 2	X0-120	
Silver	4.83	0 450	•	4 50	107	10.120	
LCS (3050550-B52)				Prepared & A	Analyzed 03/1	4/03	
Arxenic	10 ?	0 100	mg/kg	10.0	102	10-120	
Висум	10 \$	0 500	•	10,0	101	¥0+120 .	
Codmium	10 7	טטכ ט	•	10.0	1:07	@0-120	
Chromant	10 9	0.100	•	100	1:09	80 120	
Lead	11.7	0 100	•	10.0	111	20-120	
Scientum	10.3	0.500	•	100	נטו	80-120	
Silver	3.66	0 5 0 0	•	5.00	(1)	00-120	
Duplicate (3050880-DUP1)	Bio.i.	ver PIEDS	47-03	Prepared 03	/14/03 Analya	wd. 05/15/03	

Jiivei					
Duplicate (3050680-DUP1)	8cm	or PSED347-93	Prepared 03/14/03 Analyza	ul. US/15/03	
Artenic	5 49	0 191 mg/kg dry	4 18	27	40
Barlim	171	U 294 -	164	4.14	40
Cadmrum	MU	U 294 .	ND		40
Chromom	16.5	0 224 "	20 1	9 21	40
l. eud	8.76	0 294	8 00	1 90	40
	ND	0 294	מא		40
Nilver	ND	0 194	0.0474	1 26	T 0
Salestim		Q Zya	<u>-</u>	1 26	

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North Crank Analytical, I hu Environmental Leboratory Motwork Page 12 of 24



Harifita 33720 Morth Creat Phary N., Sulta 488, BENAII WA 75821 1923
A25 420 8280 fee: 425 420 11210
BERRIN BERT 11315 Montgorner, Sulta 6, Spokano, WA 59206-4776
S20-24 5280 Fee 506 524-5290
(115-8) 3905-8200 Fee 501 886 524-5290
BERRIN SULTAN SU

ODOT MILWAUKIB 3700 SE 921d Portined, OR 97266

Preject St. Johns Project Number. CON 01757-011-G23

Reported:

Project Manager: Jennic Armstrong

05/22/03 16 57

Total M etals per FPA 8000/7000 Series M othoda (Ouslity Control

Total	M etals per EF	A 6000/	Dan Ser	CS M OT	nogs	tu mitcy	Control			
	Nor	th Creek	Analyti	<u>cal - Po</u>	ortland					
Analyte	Rerult	Reporting Limit	Units	Apike Level	Source Result	%REC	%REC Limits	עץא	KFD Lum	Notes
Butch 3080660 - EPA 3060										
M atrix 3ptke (3050550-M S1)	Sou	ror P3E03	47-03	Proper	d: 05/14/0	Anulyze	ed 05/19/0	3		
Artenic	14.9	0.121	mu/kg dry	1 77	4.11	122	75.125			
- Sarain	195	0 123	•	\$ 77	164	3.00%	71-175			Ú-07
Cadangu	2.02	0 121	•	8.77	ND	1.01	75-125			
Chromlum	27.6	0.141	•	8.77	20 1	83 2	75-125			
- Lead	14.5	0.323	•	8.77	0.90	100	71-175			
helenium	4 12	0.125	•	A 77	ND	9.1.7	75 125			
Silver	4 94	0 121	•	4.31	0.0171	112	75-125			
M atrix Spike (1080850:M 82)	Sau	rce PIE03	47-04	Prepare	4 05/14/0	3 Analyz	ed: 05/L5/0	13		
Arzenic	974	Rrr'n	mg/kg dry	9,24	1,40	89.6	75-125			
Denum	142	0,331	•	5.24	127	162	75 114			Q.0
Cadmium	4.24	0.518	•	9 24	ND	100	75 (25			
Chromium	23.7	6 118	•	9 24	111	107	13-135			
Lead	In 2	0.338	•	9.24	6.29	197	75-125			
Selenium	8.53	0 3 3 8	•	9 24	U. />>	W4.1	75-125			
Silver	4 40	0.331	•	4 02	1.42	74 1	75-17.5			
Batch 3050879 - EPA 7471										
Blank (3080878-BL K1)				Prepare	ed & Analy	zed: 05/i	5/03		_	
Mercury	NU	O UNGZ	me/ke							
L CS (108087# BS1)				Ггераг	ed & Analy	yxed: 05/1	1/03			
Moreury	0.498	Ų I UŪ	m g/k g	1.00		99 8	80-110			
Dupilcate (3050579-DUP1)	Sou	irce: P3E03	63-92	Prepar	dena & be	zed: 05/4	5/0)			
Mercury	0 171	0 100	mg/kg dry		0.0825			69.E	40	0-0

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Line Domainghim, Project Manager

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Basilis Li730 North Civel Phrs M. Suite 408, Barhell, Wa 28011 2223 423-420 2200 Fsx 425-420-210

Epekawa Esti (3. 15 montgerney, Suira 0, Spekama Wa 22206 4776 309-24-910 Az 708-24-4248

Postiane 9405 Siw Himbur Avenue, Bezewitor, OA 27008-7132 501-86 2200 Fsx 303 200-228

Bend 2012 Fmprs Avenue, Suits F L. Bend OR 27701-2711 341-223-2310 fs-741-382 7789

Project: St Johns ODOT-MILWAUKIP Project Number: CON 01757-011-023 Reported: 3 /00 SE 92nd 05/22/03 16.57 Samuel Manager: Juntile Armstrong

Fortisnd, OR 97266	Project Martager: Junitie Armstrong								05/22/03 16.57		
Total	vietals per E	PA 6000/	7000 Ser	les M et	hods C	uality	Control				
	No	rth Creek	(Analyti	cal - Po	ortland				٠		
		Keporung		Spile	Source		WREC		RPD		
Analyte	Kesult	Limit	Units	Lorel	Hesuit	*REC	Limite	RPD	Limb	Notes	
Batch 3050579 - EPA 7471											
M atrix Spike (3060679-M 81)	. So	urce: P3E03	67-03	Propore	ed & Analy						
Mercury	1.28	n ngo)	mple dry	1 15	0.0115	104	75-123				
M atrix Spike (3050579-M S2)	2o	urcu: P3E04	142-00	Prepare	ed & Analy	zed. 05/1	5/ 6 3				
Mercury	1 27	0.100	nigiky dry	1.19	0.0471	101	75-125				
Butch 3050747 - EPA 200/3006											
Blank (3050747-BL K1)				Prepare	d 05/19/0	1 Analyz	red 03/21/0)3			
Cadmin	ND	0.0700	mg/l				_				
Chromium	ND	v.00100	-								
Land	ир	0 00100	•								
LCS (3050747-B51)					:d: 05/17/0		ed 05/2 i/0	11			
Cadmium	0 0950	0.00100	mg/l	0.100		91.0	80 120				
Chromiim	0 047]	0.00100	•	0 100		97.1	80-120				
Lend	0.0975	0.00100	- ,	0 100		97.5	#0-170				
Duplicate (3050747-DUP1)	Sa	urcec P3E04	27-01	Prepare	מעיועים ני	1 Annly?	ed: 05/21/0	19			
Ladmin	ND	0.00100	mg/I		NΩ				40	<u></u>	
Chromium	NU	(c) (halan	-		מא				20		
l.cad	ИÜ	0.00183	•		0 000750			16.2	10	()-C	
M atrix Spike (3050747-M S1)	8m	urce: P3E04	127-01	Prepare	ul. 05:19/0	3 Analyz	ed 05/21/0	13			
Cadmium	9 0383	0 00189	en g/l	0 1 00	ND	94.9	75-125				
Chromium	0 0790	0.00100	•	0 100	ND	22.0	71-121				
Lead	0.101	0 00100	•	0 (00	0.000730	100	73 123				

North Creek Analytical Portland

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Page 2



ODOT-MILWAUKIE 1700 SP 92ad

Project. St Johns

Project Number. CON 01757-011-G23

Reported:

Portland, OR 97266

Project Manager. Jennin Armattong

05/22/03 10.57

Diesel and Heavy Range Hydrocarbons per NW TPH-Dx M ethod North Creek Analytical - Portland

Analyte	Kesult	Kaporling Limit	Units	Cilution	Mathod	Propared	ARBIYFOO	Raich	Noira
8JB 1-9-9 (P3E0425-02) 9oil					Sampled: 05/	3/03 Rece	red 05/14	/03	
Dissel Range Organics	25.0	25 0	mg/kg dry	1	NWTPH Da	05/13/03	05/15/03	1050571	A-01
Housy Oil Range Hydrocarbons	102	50 U	<u> </u>	•	•	•	•	•	A - U I
Surr: 1-Cnloroctadecane	98.2 %	50-160							

North Creek Analytical - Portland

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Page 2 of 24

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rent Merwin - P3E0425 pdf

Project St Johns ODUT-MIL WATIKIE Reported Project Number CON 01757-011-G23 3700 SE 92nd 05/22/03 16:57 Piujuel Manager: Jennie Armstrong Porland OR 97266

Diesel and Heavy Rangellydropp bons per NWTPH Ox Method - Quality Control North Creek Analytical - Portland RPD %REC Spike RPP Limit Nulse Result %REC Limits Limb Apalyte Batch 3080574 - EPA 3515 Fuels Properce & Analyzed 05/15/03 Blank (3050574-BLK1) 25.0 ND mr/¥£ Dietel Range Organics ND 50.0 Heavy Oil Range Hydrocarbons 93 5 4 80 4 49 Sur: 1 Chlorooctedecane Prepared & Auely and 05/15/03 LCS (J080674-B91) 47.6 10-110 122 75.0 mp/kg 123 Diesel Range Organica 3 101 50.0 75.0 Heavy Oil Range Hydrocarbons J 80 927 4 45 Surr. 1-Chinnngladecane Prepared & Analyzed 03/13/03 Duplicate (3050874-DUP1) Source: P3E0314-01 SU Nľ ND 210 mg/kg day Dissel Kange Organics ٥u ND 30 O Heavy Oil Range Hydrocarbons 50-150 1 82 5 41 854 Sur 1 Chlorooctadacane Prepared, 05/15/03 Analyzed 05/16/03 Source: PSE0316-02 Duplicate (3080574-DUP2) 50 2770 2110 1250 mg/kg dry Diesel Range Organica 50 7330 2500 1450 14.2 Heavy Cit Kange Hydrocarbons 5 87 50.180 201 0 00 Surr 1-Chlorooctadecane

North Creck Analytical - Pariland

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical cuport must be reproduced in Its califely

Lisa Domenighini, Project Manager

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Page 11 of 24



OBOT: MICWAUKIE

3700 SE 9266

Project St. Johns

Project Number. CON 01757-011-G23

Reported:

Portland, OK 97206

Project Manager - Jennie Armstrong

05/22/03 16.57

Chlorinated Herbicides by EPA Method 8151A North Creek Analytical - Bothell

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North Creek Analytical - Fortland

Lisa Domenighini Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of costody document. This analytical report their be reproduced in its

Physpan Antes Laboratory Marwork

Page 8 of 24

St John's Bridge 8444 NW St. Helena Rd. Portland, OR 97210 Phone: 503-286-6177 Fax: 503-286-3507

Long Painting Company

Fax

To: funa ST. JOHN From: SEAN P. PURYES	KL_
Fax: 97/1544-2140 Pages: 5 inc. Care 1	
Phone: Date: 19 0 c T 0 4	
Ro: Soil Samples in Beydown Kind CC:	
	Recycle
• Comments:	
Awarda ,	
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the lay down yard. I also drew a of the locations. I fyou have my	questions
lesse cell me 503/296-6177.	
Sincerely	

Sean Puryear - P4I0780 FINAL 09 29 04 1217 PDF

Page 8

WWW.RCGIPDS RDIP

ODOT - MILWAUKIE

3700 SE Ward Portland OR 97208 Project Name Hojest Number Project Manager

St. Johns CON 1757-011 Paul Witthred

Rossi Coules. 09/29 /04 12:17

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Report Eperatic Notes

Mex s:

Laboratory Reporting Conventions

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NO - Analyte NOT DETERMINE the dame the respective limit (MDL o MRL respectively)

NR NA - Not Reported And Available

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North Crack Analytical - Portland

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Page 7 of 7

Sean Puryear - P4I0780 FINAL 09 29 04 1217 PDF

Page 2



St. Johns ODOT - MILWAUKIE Project Nerve Report Crested Project Number CON 1757-011 3700 SE 82nd 09/39 /04 121/ (Nul Wittbrook Project Monagor Pulking OR 87200

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Page 1 of 7

Sean Puryear - P410780 FINAL 09 29 04 1217 PDF

Page 4



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Lim Dominghills, Project Manager

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Page 3 of 7

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Page 5



ODOT - MILWAUKIE	Project Name	81. Johns		
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Lisa Demonighini, Projest Manager

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Murch Creek Analysmal The Environmental Laboratory Nations

Page 4 of 7



Department of Environmental Quality

Northwest Region Portland Office 2020 SW 4th Avenue, Suite 400 Portland, OR 97201-4987 (503) 229-5263 FAX (503) 229-6945 TTY (503) 229-5471

April 14, 2008

Re:

Dee Burch Advanced American Construction, Inc. 8444 NW St. Helens Road Portland, OR 97229

PY DO NOT ARCHIVE

Conditional No Further Action Determination

Advanced American Construction Properties LLC Former Marine Finance Property 8444 NW St. Helens Road Portland, Oregon 97229 ECSI #2352

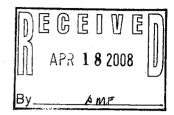
Dear Mr. Burch:

The Oregon Department of Environmental Quality (DEQ) completed a review of the document entitled *Site Development Report* dated August 11, 2006, and *May 2007 Stormwater Sampling Event* dated May 25, 2007 prepared on your behalf by Maul Foster and Alongi, Inc.

The property consists of tax lots 100, 500 and 600. These reports comprise the final deliverables required under the Scope of Work for the June 2004 Prospective Purchaser Agreement (PPA) between Advanced American Construction Property, LLC (Advanced American) and DEQ.

DEQ determined that no further action is required to address environmental contamination at the former Advanced American property provided the engineering and institutional controls installed at the site are maintained. This determination is based on the regulations and facts as we now understand them, including but not limited to the information summarized below.

A number of marine-related businesses that may have handled hazardous substances operated at the site. Since the 1920s or earlier, the site has been used by various marine construction and tow boat/barge companies and also had a warehouse in the south part of the site, as well as smaller buildings including offices, a tavern, and a private residence. Between 1936 and 1940, the area was built up with fill material, followed by construction of two buildings prior to 1957. Most of the site was leased to two metal salvage companies from 1988 to 1993. Three underground storage tanks (USTs) and a fuel pumping island were formerly located at the site. An associated fuel line led to the dock north of the bridge and may have supplied fuel for river vessels and/or been a supply line for the USTs. The USTs and associated impacted soil were removed in 1988.



Conditional No Further Action Determination Advanced American Construction Properties, LLC Page 2 of 3

DEQ conducted the initial site investigative work and corrective actions in 2001 using the Orphan Fund account. In 2004 Advanced American entered into a Prospective Purchaser Agreement (PPA) with DEQ and agreed to conduct additional site investigation in the site upland to assess the potential for ongoing impacts to the Willamette River, and appropriate remedial actions if needed.

Site investigations by Advanced American and DEQ have defined the nature and extent of contamination in site soil, storm water and groundwater in the site upland. The majority of the upland portion of the site is paved and there is little if any terrestrial ecological habitat. Advanced American removed approximately 535 cubic yards of soil with contaminants that exceeded screening criteria for the soil to sediment transport pathway. The soil was placed beneath the building foundation where it is not susceptible to erosion. Other areas were capped with at least 1 foot of clean fill.

Residual soil and groundwater contamination does not appear to present a significant threat to human health through direct contact under an occupational or construction/excavation worker exposure scenario.

In the absence of any engineering or institutional controls, levels of benzo(a)pyrene, copper and/or lead in the soil beneath the building or gravel cap could potentially be transported to the Willamette River and affect ecological receptors or humans that consume them. Therefore DEQ requires that the building and gravel caps shown in the attached figure be maintained as a condition of the NFA (See Figure 3, Site Development and Utilities). This condition for the proposed NFA is memorialized in an Easement and Equitable Servitude (E&ES) between Advanced American and DEQ that was recorded by Multnomah County on April 3, 2008.

In accordance with Oregon Revised Statute, ORS 465.320, and Oregon Administrative Rules, OAR 340-122-100, DEQ held a 30 day public comment period in the month of August 2007 to announce DEQ's proposed approval of the site cleanup and issuance of a conditional no further action (NFA) determination for the site. No comments were received.

Contamination remains on portions of the Advanced American property. DEQ approves leaving this contamination because the contamination does not present an unacceptable risk to human health, safety, welfare and the environment with the controls described above. DEQ's approval to leave contamination on the site is based on present conditions, as described in the reports named above.

Any future work in the contaminated areas of the property, including any sampling, management, and disposal of contaminated media must be performed in accordance with DEQ regulations and policies.

DEQ concludes that based on the information presented to date, the site is currently protective of public health and the environment as long as the engineering and institutional controls are maintained as described above. The site requires no further action under the



Conditional No Further Action Determination Advanced American Construction Properties, LLC Page 3 of 3

Oregon Environmental Cleanup Law, ORS 465.200 et seq., while the required conditions are maintained unless new or previously undisclosed information becomes available.

The Advanced American site was placed on DEQ's Inventory of sites that have a confirmed release and need additional investigation on March 13, 2003 as required by ORS 465.225. The facility will remain on the Inventory as required by ORS 465.230(2) as long as the unacceptable risk at the site is controlled by engineering and/or institutional controls.

DEQ recommends keeping a copy of all of the documentation associated with this remedial action with the permanent facility records.

DEQ files and the Environmental Cleanup and Site Information (ECSI) database will be updated to reflect the NFA determination upon payment of DEQ costs. DEQ will initiate project closeout activities and you should receive a final invoice from DEQ within 6 weeks.

Please be aware that this conditional NFA applies to the upland portion of the site (above the mean high water mark), and does not pertain to in-water contamination that is currently being addressed through EPA's Portland Harbor Superfund Project.

If you have any questions or comments about the information presented in this letter, please contact me at (503) 229-6825.

Sincerely

James M. Anderson, Manager

Portland Harbor Section

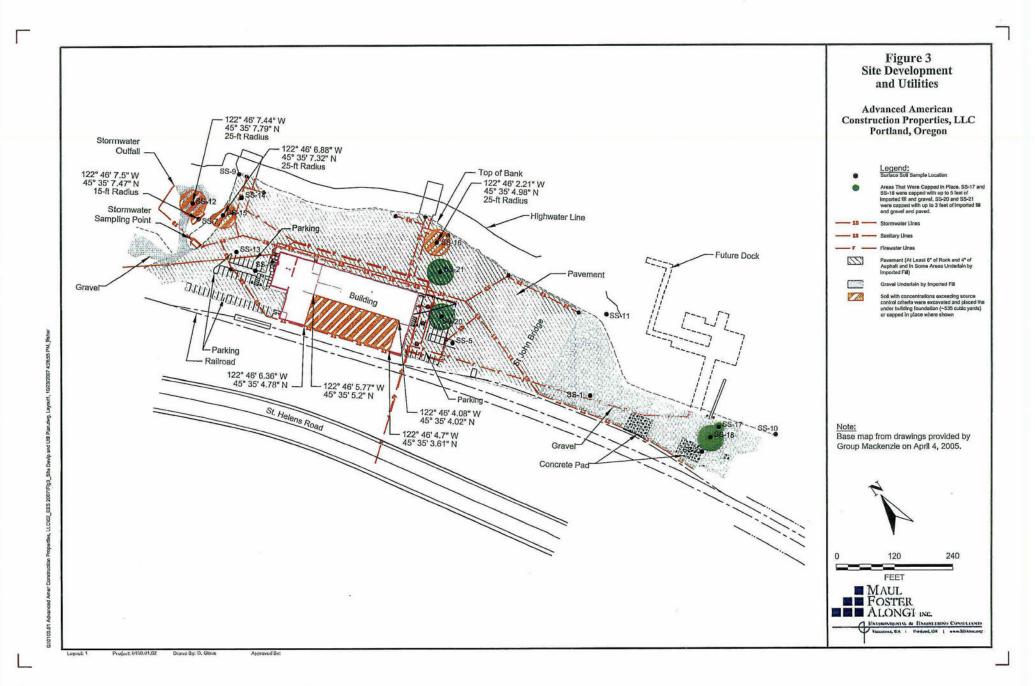
Attachment: Figure 3, Site Development and Utilities

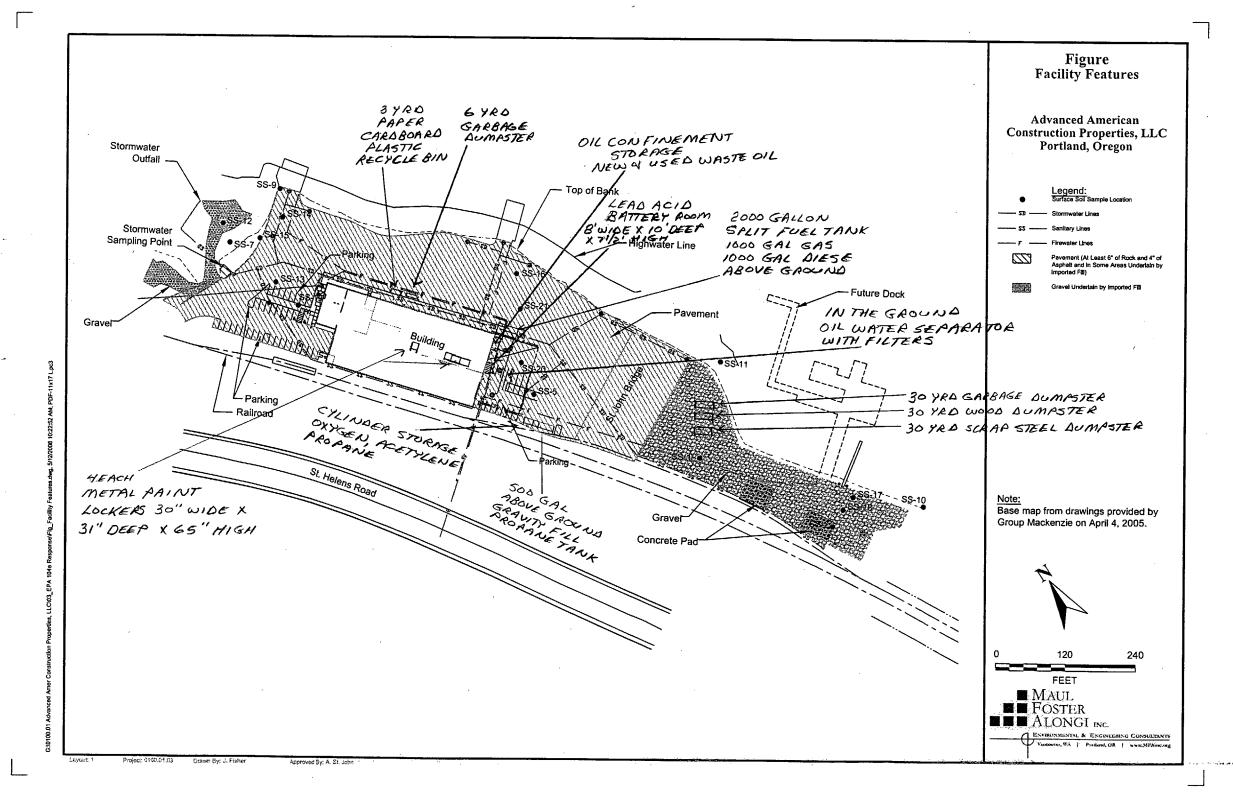
cc: Mark Pugh, DEQ NWR C/ER

Anna St. John, Maul Foster and Alongi

Christopher L. Reive, Esq.

Kristine Koch, US EPA Region 10





GROUP MACKENZIE

Civil Engineering Architecture Interior Design

Transportation Planning Land Use Planning



NEW FACILITY FOR ADVANCED AMERICAN CONSTRUCTION INC.

General Contractor
PERLO MCCORMACK PACIFIC
7190 SW Sandburg Rd.
Portland, Oregon 97223
Phone: (503) 624-2090
FAX: (503) 639-4134

Landscape Architect
VRIDIAN ENVIRONMENTAL
DESIGN
813 SW Alder
Mezzanine B
Portland Oregon 97205
Phone: (503) 222-1639
FAX: (503) 222-1853

78



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REVISIONS:

REVISIONS REVISION DELTA
CLOSING DATE
SHEET

1 X IN PROGRESS

SHEET TITLE:
SITE PLAN
NORTH

DRAWN BY: RJH

CHECKED BY:

SHEET

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SITE PLAN
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GROUP Architective Engineering Structural Engineering Interior Transportation Planning Land Us Portiand OR Vancouver WA Tacoma WA S

CONSTRUCTION AND TRUCTION

NEW FACILITY FOR ADVANCED AMERICAN CONSTRUCTION INC.

General Contractor
PERLO MCCORMACK PACIFIC
7190 SW Sandburg Rd.
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Landscape Architect
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REVISIONS:

REVISIONS REVISION DELTA CLOSING DATE

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1 X IN PROGRESS

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UTILITY PLAN

DRAWN BY: RJH
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GROUP MACKENZIE

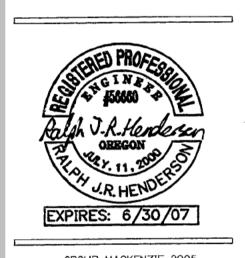
Civil Engineering Architecture
Structural Engineering Interior Design



Project
NEW FACILITY FOR
ADVANCED AMERICAN
CONSTRUCTION INC.

General Contractor
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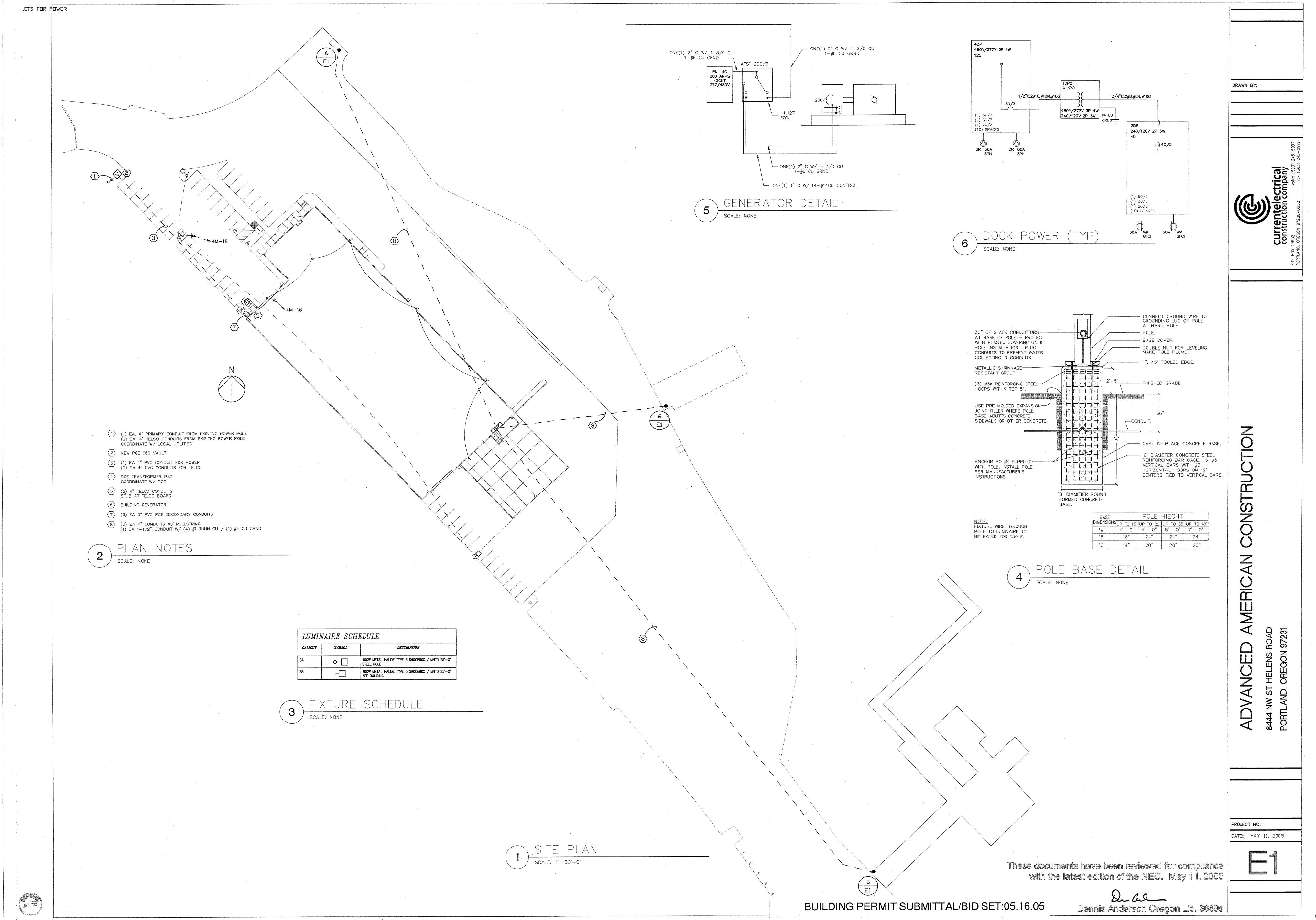
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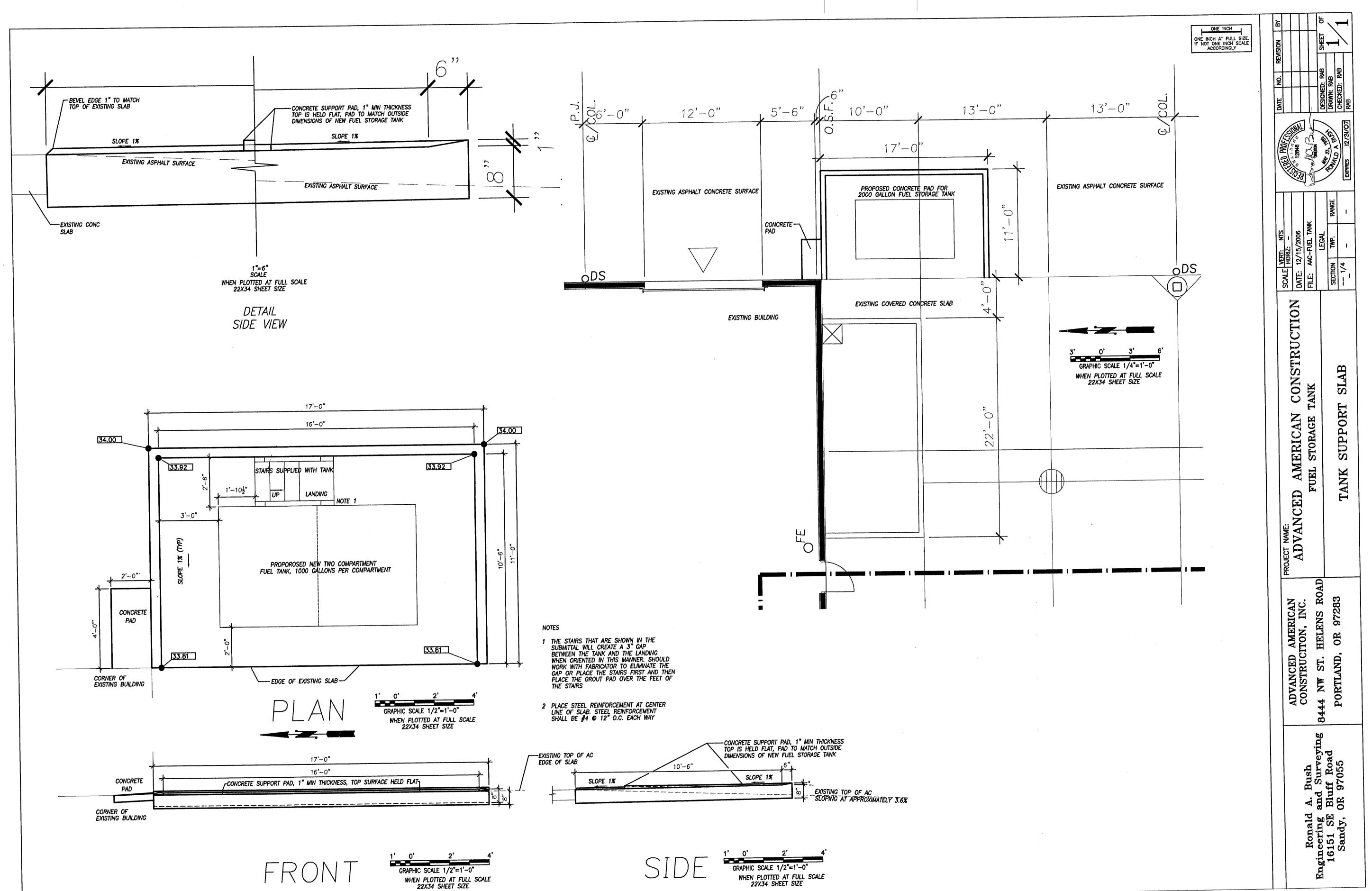
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HOW TO USE THIS MSDS MANUAL:

Search for product by three different scenarios.

Category Index

This index is arranged first by alphabetical Category, then by alphabetical Product name within each category.

Product Index

To use this index find alphabetical product name, then Category.

Manufacturer Index

To use this index find alphabetical Manufacturer name, then Product name.



DIRECTIONS: Each product appears in a designated category. Find product, go to designated category tab. You will find the product in alphabetical order in each category.

Category:	Product Name:	Also Known As:	Manufacturer:	Emerg Phon
Abrasives	Abrasive Cloth Roll (Aluminum Oxide Type)		Bowman Distribution	1-800-332-3073
ADIASIVES			Barnes Distribution	1-800-424-9300
	Aluminum Oxide Shop Rolls Coated Abrasives	Out Off Marcal Flow Mineral Conding Dies	Makita USA, Inc.	1-800-424-9300
	Abrasive Grinding Wheel	Cut-Off Wheel, Flex Wheel, Sanding Disc	Barnes Distribution	1-800-424-9300
	Briterite Surface Conditioning Discs			1-662-324-0468
	Core Grind		Tyrolit Olympus Co., LTD.	1-440-323-4616
	Diamond Drill Bits & Blades		Diamond Products	
	Emery Cloth		Barnes Distribution	1-800-424-9300
	Flap Wheels		Barnes Distribution	1-800-424-9300
	Kleen Blast		Kleen Blast Abrasives	1-925-831-9800
	Nonabrasive Cleaning Pads		Norton Company	1-508-795-269
	Metal Bonds for Diamond Blades & Bits		Penhall Diamond Products	1-714-776-093
	Resin Bonded Abrasive Products		Barnes Distribution	1-508-795-5000
	Resinoid Bonded Abrasive Wheels		Flexovit USA, Inc.	1-716-549-5100
	Resinoid Bonded Grinding Wheels		Norton Company	1-508-795-2690
	Segmented Diamond Blades and Core Bits		Penhall Construction Products	1-714-776-093
	Ultra Copper High Temp RTV Silicone		Permatex, Inc.	1-877-376-283
	Zircotex Flap Discs		Flexovit USA, Inc.	1-716-549-510
dhesives/Sealants	19S Epoxy Base Series Master		Forrest Paint Co.	1-800-424-930
(unesives/Sealants			Forrest Paint Co.	1-800-424-930
	19S Epoxy Semi-Gloss Catalyst B		Several Facilities	1-800-366-392
	ABS Pipe Cement		Dayton Superior Chemical Division	1-937-866-128
	Advantage Grout (1107)			1-800-424-930
	Asphalt Vamish (#40 Vitanic Black)		Farwest paint Manufacturing Co.	1-713-333-941
	Bio-Dur 561 Curing Agent		Thin Film Technology, Inc.	1-213-834-340
	Burke Plug		The Burke Company	
	CC 410 EP Epoxy Skidproofer		Hilti, Inc.	1-800-424-930
	Devran 230 High Build Epoxy Coating, Black Base		Devoe Coatings Company	1-800-424-930
	Drainsert		NCH Corp.	1-972-438-138
	Epoxy Mortar, Part B		Burke Chemicals	1-800-424-930
	Hi-Bond TX Part A		Celtite Technik, USA	1-502-863-680
	Hi-Bond TX Part B		Celtite Technik, USA	1-502-863-680
	Hi-Flow Grout	Portland Cement	The Euclid Chemical Company	1-800-321-762
	HIT C-100 Dowelling		Hilti, Inc.	1-800-879-444
	HIT HY 150		Hilti, Inc.	1-800-424-930
	HIT-RE 500	High Strength Adhesive for Concrete	Hilti, Inc.	1-800-424-930
	HVU	Adhesive Anchor System	Hilti, Inc.	1-800-424-930
	Interline 785	7800 Magna Line	Courtaulds Coatings	1-800-854-681
	Liquid Hardener 0202	7 000 Magna Line	ITW Devcon	1-800-424-930
	Loctite Hi-Tack Adhesive Sealant		Bowman Distribution	1-800-424-930
		Bowman/Loctite Hydraulic Sealant	Bowman Distribution	1-800-425-930
	Loctite Hydraulic Sealant	Bowman/Loctite High Strength Thread Locker	Bowman Distribution	1-800-425-930
	Loctite High Strength Thread Locker	Bowman/Loctite Medium Strength Thread Locker	Bowman Distribution	1-800-425-930
	Loctite Medium Strength Thread Locker		Bowman Distribution	1-800-425-930
	Loctite Pipe Sealant With Teflon	Bowman/Loctite Pipe Sealant With Teflon	Bowman Distribution	1-800-424-930
	Loctite Super Glue			1-904-996-600
	LV300 Injection Resin Part A		ThoRoc/Harris Specialty Chemicals, Inc.	1-517-496-590
	Multi-Purpose (732) Sealant-Clear(Dow Corning)		Dow Coming Corporation	
	MCR-43 Gloss Epoxy		Porter Paint Co.	1-502-588-920
	MEA	Resin	Hilti, Inc.	1-800-424-930
	Miami & Type K	Cement Grout	Southwestern Portland Cement Co.	1-513-878-865
	NSF 680 Retaining Compound High Strength		Loctite Corporation	1-860-571-510
	Permatex High Tack Adhesive Sealant		Bowman Distribution	1-303-623-571
	PST Pipe Sealant		Loctite Corporation	1-860-571-510
	Plastic Steel Putty (A) Resin		ITW Devcon	1-800-424-930
	Plastic Steel 5-Minute Putty (SF) Resin	•	ITW Devcon	1-800-424-930
	Pneumatic/Hydraulic Seal 545 Thread Sealant		Loctite Corporation	1-860-571-510
	Polyurethane Expanding Foam Sealant		Red Devil, Inc.	1-918-825-574



	5 A A Marray	Also Known As:	Manufacturer:	Emerg Phone
Category:	Product Name:	Also Kilowii As.	Several Facilities	1-800-255-3924
	PVC Pipe Cement		Several Facilities	1-800-255-3924
	PVC Pipe Primer		American Jetway Corporation	1-800-424-9300
	RTV Silicone - Low Volatile Blue		Bowman Distribution	1-303-623-5716
Adhesives/Sealants Cont.	RTV Blue Silicone "Easy" Gasket Maker		Crafco, Inc.	1-800-528-8242
	Roadsaver 221		REMA Tip-op International	1-800-424-9300
	SC 2000 Cement		3M Center	1-800-364-3577
	Scotch Grip (135) / High Performance Contact Adhesive			
	Scotch Grip (1357, 1357 Neutral, 1357-L) / High Performance Contact Adhesive		3M Center	1-800-364-3577
	Scotchkote Brand 206N Fusion Bonded Epoxy Coating		3M Center	1-800-364-3577
	Sikadur 36 Marine Gel Part A		Sika Corporation	1-800-424-9300 1-800-424-9300
	Sikadur 36 Marine Gel Part B		Sika Corporation	1-800-424-9300
	Sikadur 51 SL Flexible Epoxy Control Joint Resin		Sika Corporation	1-800-424-9300
	Splash Zone Mastic PT A		Carboline Co. Kop-Coat, Inc.	1-412-681-6669
	Splash Zone Mastic PT A		Kop-Coat, Inc.	1-412-681-6669
	Splash Zone Compound A & B	Z*SPAR	Kop-Coat, Inc.	1-412-681-6669
	Splash Zone Compound A-788	Z*SPAR	REMA Tip-op International	1-800-424-9300
	UT-R20 Hardener		UltraBond Manufacturing Co.	
	Wil-Bond 200		Williams Form Engineering	
	Wil-X Cement		The Sherwin Williams Company	1-216-566-2917
	Zinc Clad 108 Vinyl Coating (Part A)		The Sherwin Williams Company	1-216-566-2917
	Zinc Clad 108 Vinyl Coating (Part B) Zinc Clad 108 Vinyl Coating (Part C)		The Sherwin Williams Company	1-216-566-2917
	Zinc Clad too Virlyi Coaling (Fart C)			
			Reliance Steel & Aluminum Co.	1-213-582-2272
Aluminum Products	Aluminum Alloy		Several Facilities	1-800-255-3924
	Aluminum Coated Steel Products		Reliance Steel & Aluminum Co.	1-213-582-2272
	Carbon & Alloy Steels Corrugated Aluminum Pipe & Accessories		Several Facilities	1-800-255-3924
	Corrugated Aluminian Fibe & Accessories			
			Spectrum Laboratory Products, Inc.	1-800-424-9300
<u>Chemicals</u>	Acetic Acid		James River Corporation/Camas Mill	1-206-834-3021
	Chlorine Dioxide		Hilti, Inc.	1-800-424-9300
	Safety Boosters Trisodium Phosphate Anhydrous		Kelley Technical Coatings	1-303-595-9048
	Insodium Phosphate Annydrous			
.= .	7 (01)		Metro-Chem	1-360-944-6100
Cleaners/Solvents	001-M Waterless Handcleaner with Z-CON		Alconox, Inc.	1-800-255-3924
	Alconox		Bowman Distribution	1-303-623-5716
	Anti-Static CRT Cleaner		Certified Labs, Div. of NCH Corp.	1-800-424-9300
	Aqua-Soi 20/20 Ballistol		Washington Trading Company	1-252-261-6181
	Bailistoi Big Orange		ZEP Manufacturing Company	1-877-541-2016 1-708-598-7100
	Blast-Off Carb & Choke Cleaner BD1032		Hydrosol, Inc.	1-708-598-7100
	Brake Parts Cleaner BD1025		Hydrosol, Inc.	1-213-437-2813
	Coldwash		Unitor Ships Service, Inc. Permatex Industrial Corporation	1-203-571-5100
	Fast Orange Pumice Hand Cleaner		Lawson Products, Inc.	1-303-623-5716
	Glass Cleaner		GOJO, Ind., Inc.	1-800-424-9300
	GOJOr Natural Orange Purnice Hand Cleaner		CRC Industries, Inc.	1-215-674-4300
	Heavy Duty Degreaser Aerosol		Milwaukee Electric Tool Corporation	1-800-424-9300
•	Hawg Wash		Jadco Chemical, Ltd.	1-800-424-9300
	Landa Dyna Might		Hilti, Inc.	1-800-424-9300
	MC300 Biodegreaser		Texas Refinery Corp.	1-800-424-9300
	Moly 880 Crown & Chassis		Bowman Distribution	1-216-416-7200
	Non-ODC Brake Cleaner		Bowman Distribution	1-216-416-7200
	Non-ODC Brake Cleaner - Aerosol		Bowman Distribution	1-216-416-7200
	Ozzy Juice Degreasing Solution Penofin Weatherblaster		Performance Coatings, Inc.	1-707-462-3023
	Power Plus II Carb, Choke & Throttle Body Cleaner		Bowman Distribution	1-800-424-9300 1-360-944-6100
	191 Power Plus		Metro-Chem	1-800-752-7869
	Safety-Kleen Premium Solvent		Safety-Kleen Corp.	1-800-255-3924
	Simple Green Cleaner / Degreaser		Sunshine Makers, Inc. ZEP Manufacturing Company	1-877-541-2016
	Soy Response (Aerosol)		Shell	1-800-424-9300
	Toluene		Imperial Paint Company, Inc.	1-800-424-9300
	Wax & Grease Remover	Atominum Closess	ZEP Manufacturing Company	1-877-428-9937
	Zep-A-Lume	Aluminum Cleaner	ZEP Manufacturing Company	1-877-428-9937
	Zep Formula 50		ZEP Manufacturing Company	1-877-428-9937
	Zep Reach		Wasser Corporation	1-800-627-2968
	Zinc Standard Grey 2.8			

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Category:	Product Name:	Also Known As:	Manufacturer:	Emerg Phone
Concrete Materials	Ready Mix Concrete		Ross Island Sand & Gravel	503-239-5504
Electrical	Delco Batteries		Delco Remy Division	1-317-646-3080
	Heavy Wall Heat Shrink Tubing		Bowman Distribution	1-800-424-9300
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<u>Lubricants/Fuels/Oils</u>	3-36 Aerosol		CRC Chemicals	1-215-674-4300
	Anti-Seize High Temperature Thread Compound		Bowman Distribution	1-800-424-9300
	ATF Mercon/Dexron II A W Hydraulic Oil ISO-32		Equilon Enterprises, LLC.	1-877-276-7283
	CCX-97		Moraine Liquid Technologies	1-800-851-0403
	CCX-97 Aerosol		Certifled Labs, Div. of NCH Corp. Certifled Labs, Div. of NCH Corp.	1-800-424-9300 1-800-424-9300
	Chevron Regular Gasoline		Chevron	1-800-457-2022
	Chevron AW Hydraulic Oil 46		Chevron	1-800-457-2022
	Chevron Way Oil Vistac / ISO 220		Chevron	1-800-457-2022
	Chuck Grease		Hilti, Inc.	1-800-424-9300
	CRC Penetrating Oil (Aerosol) #3060		CRC Chemicals	1-215-674-4300
Lubricants/Fuels/Oils Cont.	Diesel No.2		ARCO Products Company	1-800-424-9300
	Diesel No.2 - Texaco		Texaco Refining & Marketing, Inc.	1-914-831-3400
	Diesel Fuel No.2		Chevron	1-800-457-2022
	Diesel Fuel No.2 (HS)		Chevron	1-800-457-2022
	Diethylenetriamine		Union Carbide Chemicals & Plastics Co., Inc.	1-800-822-4357
	Duct Seal		GB Electrical, Inc.	1-800-624-4320
	Enerpac HE	Super Premium Synthetic Food Grade Breathing Air	Benz Oil, Inc.	1-414-442-2900
	EZ-1000	Compressor Fluid	Undersea Breathing Systems, Inc.	1-561-588-7698
	Isopropanol	Compressor Fluid	Huron Industries	1-800-984-4213
•	Low Sulfur Diesel No.2		ARCO Products Company	1-800-424-9300
	Lubriplate "APG" Series		Fiske Brothers Refining Co.	1-201-589-9150
	Lubriplate 105		Fiske Brothers Refining Co.	1-201-589-9150
	Lubriplate 105		Bowman Distribution	1-303-623-5716
	Multigear Lube EP SAE 80W-90		Texaco Industries, Inc.	1-800-424-9300
	Nautica #120		Certified Labs, Div. of NCH Corp.	1-800-424-9300
	Never-Seez Regular Grade Nitromethane		Bostik, Inc.	1-800-227-0332
	Off-Road DieselNo.2		Angus Chemical Company ARCO Products Company	1-800-424-9300 1-800-424-9300
	Offshore Oil		Blue Star Industries	1-800-424-9300
	Penetrating Oil	•	Kano Laboratories	1-615-833-4101
	Porpane		American Energy Propane Inc	1-800-728-2482
	Premalube Xtreme Green		Certified Labs, Div. of NCH Corp.	1-800-424-9300
	Pyroshield 5180		Lubrication Engineers, Inc.	1-817-834-6321
	Rapid Tap		Relton Corporation	1-800-424-9300
	Rando Oil HD 46		Texaco Refining & Marketing, Inc.	1-914-831-3400
	Reavellite Compressor Lubricant		CompAir Reavell Limited (England)	0-473-602222
	Ridge Dark Thread Cutting Oil		Ridge Tool Company	1-216-323-5581
	Silicone Lube Spray Lubricant		Bowman Distribution	1-303-623-5716
	Synthetic Lubricating Oil		Hilti, Inc. Hilti, Inc.	1-800-424-9300 1-800-424-9300
	Tekusolv II Red		Certified Labs, Div. of NCH Corp.	1-800-424-9300
	Texaco Antifreeze/Coolant		Texaco Industries, Inc.	1-800-424-9300
	Texaco Rando HD-22 - 68		Chevron Texaco	1-800-231-0623
	Ursa Super Plus SAE 15W-40		Texaco Industries, Inc.	1-800-424-9300
	Ursa Super Plus SAE 30		Texaco Industries, Inc.	1-800-424-9300
	Vari-Purpose Gear Lubricant, SAE 140		Texas Refinery Corp.	1-800-424-9300
	Wynn's Ultra-Synthet 951		Wynn Oil Company	1-800-424-9300
Paints/Primers/Thinners	31E Acrylic / Alkyd Enamel Aerosol Series		Forrest Paint Co.	1-800-424-9300
	Alert Orange Spray Paint	Spray Paint	Rust-Oleum Corporation	1-847-367-7700
	Bar-OX 450 Alkyd Gloss Enamel Signal Yellow	• • • · ·	Devoe Coatings Company	1-800-424-9300
	Blue Striping		Rust-Oleum Corporation	1-847-367-7700
	Caution Blue Spray	Spray Paint	Rust-Oleum Corporation	1-847-367-7700
	Caution Yellow Spray	Spray Paint	Rust-Oleum Corporation	1-847-367-7700
	CS 2130 Polyurethane Sealant	₩la1 a. a. a.	Hilti, Inc.	1-800-424-9300
	Evamarine, Marine Thinner	Thinner		1-800-424-9300



Category:	Product Name:	Also Known As:	Manufacturer:	Emerg Phone
Paints/Primers/Thinners Cont.	Fluorescent Green	Spray Paint	Rust-Oleum Corporation	1-847-367-7700
	Fluorescent Green Spray	Spray Paint	Rust-Oleum Corporation	1-847-367-7700
	Fluorescent Orange	Spray Paint	Rust-Oleum Corporation	1-847-367-7700
	Fluorescent Red	Spray Paint	Rust-Oleum Corporation	1-847-367-7700
	Fluorescent Yellow	Spray Paint	Rust-Oleum Corporation	1-847-367-7700
	Ford Blue	Spray Famil	Seymour of Sycamore, Inc.	1-800-255-3924
			Bowman Distribution	1-800-424-9300
	Ford Blue High Solids Coating		Bowman Distribution	1-800-424-9300
	Glass Black		Bowman Distribution	1-800-424-9300
	Gloss White High Solids Coating		Courtaulds Coatings	1-800-854-6813
	Gray Primer 351 (Part A)		Bowman Distribution	1-800-424-9300
	I H Red Solids Coating Industrial Water Based Enamel		Bowman Distribution	1-800-424-9300
			Markal Company	1-312-826-1700
	Markal Paintstik "B" & "B-3"		The Sherwin-Williams Company	1-216-566-2917
	Hi Bild Vinyl Finish, V766E Gray		The Sherwin-Williams Company	1-216-566-2917
	Hi Bild Vinyl Finish, V766E White			1-847-367-7700
	High Visibility Yellow		Rust-Oleum Corporation	1-800-424-9300
	MC 850 Sprayable Gel Graffiti Remover		Hilti, Inc.	1-847-367-7700
	Medium Blue Striping #9805118		Rust-Oleum Corporation	1-847-307-7700
	Primer Pretreatment for Metals		Rodda Paint Company	4 000 055 0004
	Red Iron Oxide Primer		Seymour of Sycamore, Inc.	1-800-255-3924
	Red Iron Oxide Primer High Solids Coating		Bowman Distribution	1-303-623-5716
	Red-Orange Fluorescent Spray		Rust-Oleum Corporation	1-847-367-7700
	Red Oxide Fast Dry Metal Primer		Kelley Technical Coatings	1-800-424-9300
	Red Striping Paint		Rust-Oleum Corporation	1-847-367-7700
	Safety Red Spray Paint		Rust-Oleum Corporation	1-847-367-7700
	Semi-Transparent Stain	Penofin for Exotic Hardwood	Performance Coatings, Inc.	1-800-424-9300
	Semi-Transparent Stain	Penofin for Pressure Treated Wood	Performance Coatings, Inc.	1-800-424-9300
	Semi-Transparent Stain	Penofin Ultra Premlum Oil	Performance Coatings, Inc.	1-800-424-9300
	Semi-Transparent Stain	Penofin Oil 550 VOC Formula	Performance Coatings, Inc.	1-800-424-9300
	SOL/3	Stain	The Sherwin-Williams Company	1-216-566-2917
	Super Cold Galv (Aerosol)		Harris Welco	1-800-424-9300
	Super Cold Galv (Bulk)		Thermacote Welco	1-704-739-6421
	Thinner #4		Carboline Co.	1-800-424-9300
	Underwater Hull Coating, Black		Devoe Coatings Company	1-800-424-9300
	Valve Action Paintmaker		LA-CO Industries, Inc. / Markal Co.	1-800-424-9300
	W.B. Convoy II, Light Gray		Kelley Technical Coatings	1-502-636-2561
	White Spray Paint	•	Rust-Oleum Corporation	1-847-367-7700
	White Striping		Rust-Oleum Corporation	1-847-367-7700
	Xylene		Miller Paint Co.	1-800-424-9300
	Yellow Striping		Rust-Oleum Corporation	1-847-367-7700
PVC/HDPE Products	PVC Plastic Pipe		Several Facilities	1-800-255-3924
	PVC Truss & Solid Wall Pipe		Several Facilities	1-800-255-3924
Steel Products	Aramid Fiber Bonded Corrugated Steel Pipe		Several Facilities	1-800-255-3924
<u> </u>	Asphalt Coated Steel Products		Several Facilities	1-800-255-3924
	Mechanical Tubing		Western Tube & Conduit Corporation	1-213-537-6300
	Polymeric Coated Steel Products		Several Facilities	1-800-255-3924
	Stainless Steels		Reliance Steel & Aluminum Co.	1-213-582-2272
	Steel, High Strength Low Alloy		Geneva Steel	1-801-227-9475
	Zinc-Coated Steel Products		Several Facilities	1-800-255-3924
Welding Products	#5 Solder		Thermacote Welco	1-704-739-6421
Welding Floudets			Harris Welco	1-800-424-9300
	#5 Solder		Linde Union Carbide	1-800-822-4357
	Acetylene		Linde Union Carbide	1-800-822-4357
	All State Air Control Are Coursing Floritaging		The ESAB Group, Inc.	1-717-637-8911
	All-State Air Carbon Arc Gouging Electrodes		Praxair	1-800-424-9300
	Argon		Avesta Polarit, Inc.	1-800-424-9300
	Cr-Ni and Ni Alloy Coated Electrodes		The Lincoln Electric Company	1-216-481-8100
	Excalibur 7018 Fleetweld 5P+		The Lincoln Electric Company The Lincoln Electric Company	1-216-481-8100



Category:	Product Name:	Also Known As:	Manufacturer:	Emerg Phone
Welding Products Cont.	Fleetweld 35		The Lincoln Electric Company	1-216-481-8100
	Fleetweld 180		The Lincoln Electric Company	1-216-481-8100
	Gai Viz		Harris Welco	1-800-424-9300
	Innershield NR-211-MP Jet-LH 78 MR Jetweld LH-110M MR Jetweld 3 Murex 7018 MR (Speedex HTS-M MR) Oxygen Stainless Jobpak Welco 15-15FC Yellow Tail Wet Welding Electrodes Zinc		The Lincoln Electric Company The Lincoln Electric Company The Lincoln Electric Company The Lincoln Electric Company The Lincoln Electric Company The Lincoln Electric Company Union Carbide Eutectic Corporation Harris Welco Magnum Mfg., Inc. Pasminco Incorporated	1-216-481-8100 1-216-481-8100 1-216-481-8100 1-216-481-8100 1-216-481-8100 1-304-744-3487 1-704-527-9800 1-800-424-9300 1-760-868-6748 1-800-424-9300
Wood Products	Ammoniacal Copper Zinc Arsenate (ACZA) Treated Wood Ammoniacal Copper Zinc Arsenate (ACZA) Treated Wood Creosote Petroleum 50/50 Treated Wood Creosote Treated Wood Pentachlorophenol Treated Wood Sea Sweep Termin-8 Wood Preservative, Green Wolmanized Wood & Lumber Wood Dust		Taylor Lumber & Treating, Inc. JH Baxter JH Baxter JH Baxter JH Baxter Haxter Mantek, Division of NCH Corp. Jasco Chemical Wheeler Consolidated, Inc. Wheeler Consolidated, Inc.	1-800-424-9300 1-800-424-9300 1-800-424-9300 1-800-424-9300 1-800-424-9300 1-972-438-1381 1-800-424-9300 1-800-424-9300 1-800-424-9300



Product Name:	Category:	Also Known As / or Used For:	Manufacturer:	Emerg Phone
#5 Solder	Welding Products		Harris Welco	1-800-424-9300
#5 Solder	Welding Products		Thermacote Welco	1-704-739-6421
001-M Waterless Handcleaner with Z-CON	Cleaners / Solvents		Metro-Chem	1-360-944-6100
191 Power Plus	Cleaners / Solvents		Metro-Chem	1-360-944-6100
19S Epoxy Base Series Master	Adhesives / Sealants		Forrest Paint Co.	1-800-424-9300
19S Epoxy Semi-Gloss Catalyst B	Adhesives / Sealants		Forrest Paint Co.	1-800-424-9300
31E Acrylic / Alkyd Enamel Aerosol Series	Paints / Primers / Thinners		Forrest Paint Co.	1-800-424-9300
3-36 Aerosol	Lubricants / Fuels / Oils		CRC Chemicals	1-215-674-4300
Abrasive Cloth Roll (Aluminum Oxide Type)	Abrasives		Bowman Distribution	1-800-332-3073
Abrasive Grinding Wheel	Abrasives	Cut-Off Wheel, Flex Wheel, Sanding Disc	Makita USA, Inc.	1-800-424-9300
ABS Pipe Cement	Adhesives / Sealants	out on vinou, violatinous, curious, guilding piece	Several Facilities	1-800-366-3924
Acetic Acid	Chemicals			1-800-424-9300
			Spectrum Laboratory Products, Inc.	
Acetylene	Welding Products	•	Linde Union Carbide	1-800-822-4357
Advantage Grout (1107)	Adhesives / Sealants		Dayton Superior Chemical Division	1-937-866-1286
Air	Welding Products		Linde Union Carbide	1-800-822-4357
Alconox	Cleaners / Solvents		Alconox, Inc.	1-800-255-3924
Alert Orange Spray Paint	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
All-State Air Carbon Arc Gouging Electrodes	Welding Products		The ESAB Group, Inc.	1-717-637-8911
Aluminum Alloy	Aluminum Products		Reliance Steel & Aluminum Co.	1-213-582-2272
Aluminum Coated Steel Products	Aluminum Products		Several Facilities	1-800-255-3924
Aluminum Oxide Shop Rolls Coated Abrasives	Abrasives		Barnes Distribution	1-800-424-9300
Ammoniacal Copper Zinc Arsenate (ACZA) Treated Wood	Wood Products		JH Baxter	1-800-424-9300
Ammoniacal Copper Zinc Arsenate (ACZA)				
Treated Wood	Wood Products		Taylor Lumber & Treating, Inc.	1-800-424-9300
Anti-Seize High Temperature Thread Compound	Lubricants / Fuels / Oils		Bowman Distribution	1-800-424-9300
Anti-Static CRT Cleaner	Cleaners / Solvents		Bowman Distribution	1-303-623-5716
Agua-Sol 20/20	Cleaners / Solvents		Certified Labs, Div. of NCH Corp.	1-800-424-9300
Aramid Fiber Bonded Corrugated Steel Pipe	Steel Products		Several Facilities	1-800-255-3924
			Praxair	1-800-424-9300
Argon	Welding Products			
Asphalt Coated Steel Products	Steel Products		Several Facilities	1-800-255-3924
Asphalt Varnish (#40 Vitanic Black)	Adhesives / Sealants		Farwest paint Manufacturing Co.	1-800-424-9300
ATF Mercon/Dexron II	Lubricants / Fuels / Oils		Equilon Enterprises, LLC.	1-877-276-7283
A W Hydraulic Oil	Lubricants / Fuels / Oils		Moraine Liquid Technologies	1-800-851-0403
Ballistol	Cleaners / Solvents		Washington Trading Company	1-252-261-6181
Bar-OX 450 Alkyd Gloss Enamel Signal Yellow	Paints / Primers / Thinners		Devoe Coatings Company	1-800-424-9300
Big Orange	Cleaners / Solvents		ZEP Manufacturing Company	1-877-541-2016
Bio-Dur 561 Curing Agent	Adhesives / Sealants		Thin Film Technology, Inc.	1-713-333-9415
Blast-Off Carb & Choke Cleaner BD1032	Cleaners / Solvents			1-708-598-7100
			Hydrosol, Inc.	
Blue Striping	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
Brake Parts Cleaner BD1025	Cleaners / Solvents		Hydrosol, Inc.	1-708-598-7100
Briterite Surface Conditioning Discs	Abrasives	•	Barnes Distribution	1-800-424-9300
Burke Plug	Adhesives / Sealants		The Burke Company	1-213-834-3401
Carbon & Alloy Steels	Aluminum Products		Reliance Steel & Aluminum Co.	1-213-582-2272
Caution Blue Spray	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
Caution Yellow Spray	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
CC 410 EP Epoxy Skidproofer	Adhesives		Hilti, Inc.	1-800-424-9300
			•	1-800-424-9300
CCX-97	Lubricants / Fuels / Oils		Certified Labs, Div. of NCH Corp.	
CCX-97 Aerosol	Lubricants / Fuels / Oils		Certified Labs, Div. of NCH Corp.	1-800-424-9300
Chevron AW Hydraulic Oil 46	Lubricants / Fuels / Oils		Chevron	1-800-457-2022
Chevron Regular Gasoline	Lubricants / Fuels / Oils		Chevron	1-800-457-2022
Chevron Way Oil Vistac / ISO 220	Lubricants / Fuels / Oils		Chevron	1-800-457-2022
Chlorine Dioxide	Chemicals		James River Corporation/Camas Mill	1-206-834-3021
Chuck Grease	Lubricants / Fuels / Oils		Hilti, Inc.	1-800-424-9300
Coldwash	Cleaners / Solvents		Unitor Ships Service, Inc.	1-213-437-2813
Core Grind	Abrasives		Tyrolit Olympus Co., LTD.	1-662-324-0468



	Product Name:	Category:	Also Known As / or Used For:	Manufacturer:	Emerg Phone
	Corrugated Aluminum Pipe & Accessories	Aluminum Products		Several Facilities	1-800-255-3924
	CRC Penetrating Oil (Aerosol) #3060	Lubricants / Fuels / Oils		CRC Chemicals	1-215-674-4300
(Creosote Petroleum 50/50 Treated Wood	Wood Products		JH Baxter	1-800-424-9300
(Creosote Treated Wood	Wood Products		JH Baxter	1-800-424-9300
(Cr-Ni and Ni Alloy Coated Electrodes	Welding Products		Avesta Polarit, Inc.	1-800-424-9300
	CS 2130 Polyurethane Sealant	Paints / Primers / Thinners		Hilti, Inc.	1-800-424-9300
	Delco Batteries	Electrical		Delco Remy Division	1-317-646-3080
	Devran 230 High Build Epoxy Coating, Black Base	Adhesives / Sealants		Devoe Coatings Company	1-800-424-9300
Į	Diamond Drill Bits & Blades	Abrasives		Diamond Products	1-440-323-4616
C	Diesel Fuel No.2	Lubricants / Fuels / Oils		Chevron	1-800-457-2022
ι	Diesel Fuel No.2 (HS)	Lubricants / Fuels / Oils		Chevron	1-800-457-2022
	Diesel No.2	Lubricants / Fuels / Oils		ARCO Products Company	1-800-424-9300
	Diesel No.2 - Texaco	Lubricants / Fuels / Oils		Texaco Refining & Marketing, Inc.	1-914-831-3400
	Diethylenetriamine	Lubricants / Fuels / Oils		Union Carbide Chemicals & Plastics Co., Inc.	1-800-822-4357
	• • • • • • • • • • • • • • • • • • • •			NCH Corp.	1-972-438-1381
	Drainsert	Adhesives / Sealants			
L	Duct Seal	Lubricants / Fuels / Oils		GB Electrical, Inc.	1-800-624-4320
F	Emery Cloth	Abrasives		Barnes Distribution	1-800-424-9300
	Energac HE	Lubricants / Fuels / Oils		Benz Oil. Inc.	1-414-442-2900
	The state of the s	Adhesives / Sealants		Burke Chemicals	1-800-424-9300
	Epoxy Mortar, Part B			Burke Chemicals	
	Evamarine, Marine Thinner	Paints / Primers / Thinners			1-800-424-9300
£	Excalibur 7018	Welding Products		The Lincoln Electric Company	1-216-481-8100
			Super Premium Synthetic Food Grade		
E	EZ-1000	Lubricants / Fuels / Oils	Breathing Air Compressor Fluid	Undersea Breathing Systems, Inc.	1-561-588-7698
	- 10 5 1 1 10	0		December 1 of the Comment	4 000 574 5400
	Fast Orange Purnice Hand Cleaner	Cleaners / Solvents		Permatex Industrial Corporation	1-203-571-5100
	Flap Wheels	Abrasives		Barnes Distribution	1-800-424-9300
	Fleetweld 180	Welding Products		The Lincoln Electric Company	1-216-481-8100
F	Fleetweld 35	Welding Products		The Lincoln Electric Company	1-216-481-8100
F	Fleetweld 5P+	Welding Products		The Lincoln Electric Company	1-216-481-8100
F	Fluorescent Green	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
	Fluorescent Green Spray	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
	Fluorescent Orange	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
	Fluorescent Red	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
	Fluorescent Yellow	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
	Ford Blue	Paints / Primers / Thinners		Seymour of Sycamore, Inc.	1-800-255-3924
i	Ford Blue High Solids Coating	Paints / Primers / Thinners		Bowman Distribution	1-800-424-9300
,	Sal Viz	Welding Products		Harris Welco	1-800-424-9300
	Glass Cleaner	Cleaners / Solvents		Lawson Products, Inc.	1-303-623-5716
	Gloss Black	Paints / Primers / Thinners		Bowman Distribution	1-800-424-9300
	Gloss White High Solids Coating	Paints / Primers / Thinners		Bowman Distribution	1-800-424-9300
(GOJOr Natural Orange Pumice Hand Cleaner	Cleaners / Solvents		GOJO Industries, Inc.	1-800-424-9300
(Gray Primer 351 (Part A)	Paints / Primers / Thinners		Courtaulds Coatings	1-800-854-6813
	Hawg Wash	Cleaners / Solvents		Milwaukee Electric Tool Company	1-800-424-9300
	Heavy Duty Degreaser Aerosol	Cleaners / Solvents		CRC Industries, Inc.	1-215-674-4300
		Electrical		Bowman Distribution	1-800-424-9300
	Heavy Wall Heat Shrink Tubing				
	Hi Bild Vinyl Finish, V766E Gray	Paints / Primers / Thinners		The Sherwin-Williams Company	1-216-566-2917
	Hi Bild Vinyl Finish, V766E White	Paints / Primers / Thinners		The Sherwin-Williams Company	1-216-566-2917
	Hi-Bond TX Part A	Adhesives / Sealants		Celtite Technik, USA	1-502-863-6800
į	Hi-Bond TX Part B	Adhesives / Sealants		Celtite Technik, USA	1-502-863-6800
ł	Hi-Flow Grout	Adhesives / Sealants		The Euclid Chemical Company	1-800-321-7628
	High Visibility Yellow	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
	HIT C-100 Dowelling	Adhesives / Sealants		Hilti, Inc.	1-800-879-4444
	HIT HY 150	Adhesives / Sealants		Hilti, Inc.	1-800-424-9300
			High Strangth Adhesive for Consests	Hilti, Inc.	1-800-424-9300
Ц	HIT-RE 500 HVU	Adhesives / Sealants Adhesives / Sealants	High Strength Adhesive for Concrete Adhesive Anchor System	Hilti, Inc. Hilti, Inc.	1-800-424-9300



	Product Name:	Category:	Also Known As / or Used For:	Manufacturer:	Emerg Phone
1	I H Red Solids Coating	Paints / Primers / Thinners		Bowman Distribution	1-800-424-9300
	Industrial Water Based Enamel	Paints / Primers / Thinners		Bowman Distribution	1-800-424-9300
	Innershield NR-211-MP	Welding Products		The Lincoln Electric Company	1-216-481-8100
	Interline 785	Adhesives / Sealants	7800 Magna Line	Courtaulds Coatings	1-800-854-6813
		Lubricants / Fuels / Oils	, , , , , , , , , , , , , , , , , , , ,	Huron Industries	1-800-535-5053
	Isopropanol	Capricario i i dolo i olio			
J	Jet-LH 78 MR	Welding Products		The Lincoln Electric Company	1-216-481-8100
J		Welding Products		The Lincoln Electric Company	1-216-481-8100
	Jetweld 3 Jetweld LH-110M MR	Welding Products		The Lincoln Electric Company	1-216-481-8100
	Jeweld Ln-110M MR	**Claing / Toddolo			
ĸ	Kteen Blast	Abrasives		Kleen Blast Abrasives	1-925-831-9800
• • • • • • • • • • • • • • • • • • • •	TACOT DIAG.				
L	Landa Dyna Might	Cleaners / Solvents		Jadco Chemical, Ltd.	1-800-424-9300
-	Liquid Hardener 0202	Adhesives / Sealants		ITW Devcon	1-800-424-9300
	Loctite High Strength Thread Locker	Adhesives / Sealants		Bowman Distribution	1-800-425-9300
	Loctite Hi-Tack Adhesive Sealant	Adhesives / Sealants		Bowman Distribution	1-800-424-9300
	Loctite Hydraulic Sealant	Adhesives / Sealants		Bowman Distribution	1-800-425-9300
	Loctite Medium Strength Thread Locker	Adhesives / Sealants		Bowman Distribution	1-800-425-9300
	Loctite Pipe Sealant With Teflon	Adhesives / Sealants		Bowman Distribution	1-800-425-9300
	Loctite Super Glue	Adhesives / Sealants		Bowman Distribution	1-800-424-9300
	Low Sulfur Diesel No.2	Lubricants / Fuels / Oils		ARCO Products Company	1-800-424-9300
	Lubriplate "APG" Series	Lubricants / Fuels / Oils		Fiske Brothers Refining Co.	1-201-589-9150
	Lubriplate 105	Lubricants / Fuels / Oils		Fiske Brothers Refining Co.	1-201-589-9150 1-303-623-5716
	Lubriplate 105	Lubricants / Fuels / Oils		Bowman Distribution ThoRoc/Harris Specialty Chemicals, Inc.	1-904-996-6000
	LV300 Injection Resin Part A	Adhesives / Sealants		morodrams Specially Chemicals, inc.	1-504-550-0000
8.4	AA A A D CAACH BOT A TO OF	Paints / Primers / Thinners		Markal Company	1-312-826-1700
IVI	Markal Paintstik "B" & "B-3"	Paints / Primers / Thinners		Hilti, Inc.	1-800-424-9300
	MC 850 Sprayable Gel Graffiti Remover	Cleaners / Solvents		Hilti, Inc.	1-800-424-9300
	MC300 Biodegreaser	Adhesives / Sealants		Porter Paint Co.	1-502-588-9200
	MCR-43 Gloss Epoxy MEA	Adhesives / Sealants	Resin	Hilti, Inc.	1-800-424-9300
	Mechanical Tubing	Steel Products		Western Tube & Conduit Corporation	1-213-537-6300
	Medium Blue Striping #9805118	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
	Metal Bonds for Diamond Blades & Bits	Abrasives		Penhall Diamond Products	1-714-776-0937
	Miami & Type K	Adhesives / Sealants	Cement Grout	Southwestern Portland Cement Co.	1-513-878-8651
	Moly 880 Crown & Chassis	Cleaners / Solvents		Texas Refinery Corp.	1-800-424-9300
	Multigear Lube EP SAE 80W-90	Lubricants / Fuels / Oils		Texaco Industries, Inc.	1-800-424-9300
	Multi-Purpose (732) Sealant-Clear(Dow Corning)	Adhesives / Sealants		Dow Coming Corporation	1-517-496-5900 1-216-481-8100
	Murex 7018 MR (Speedex HTS-M MR)	Welding Products		The Lincoln Electric Company	1-210-401-0100
		Lubricants / Fuels / Oils		Certified Labs, Div. of NCH Corp.	1-800-424-9300
N				Bostik, Inc.	1-800-227-0332
	Never-Seez Regular Grade	Lubricants / Fuels / Oils Lubricants / Fuels / Oils		Angus Chemical Company	1-800-424-9300
	Nitromethane Nonabrasive Cleaning Pads	Abrasives		Norton Company	1-508-795-2690
	•	Cleaners / Solvents		Bowman Distribution	1-216-416-7200
	Non-ODC Brake Cleaner Non-ODC Brake Cleaner - Aerosol	Cleaners / Solvents		Bowman Distribution	1-216-416-7200
	NSF 680 Retaining Compound High Strength	Adhesives / Sealants		Loctite Corporation	1-860-571-5100
0	Off-Road DieselNo.2	Lubricants / Fuels / Oils		ARCO Products Company	1-800-424-9300
_	Offshore Oil	Lubricants / Fuels / Oils		Blue Star Industries	1-800-424-9300
	Oxygen	Welding Products		Union Carbide	1-304-744-3487
	Ozzy Juice Degreasing Solution	Cleaners / Solvents		Bowman Distribution	1-216-416-7200
_	D 6- W H H H H	Cleaners / Solvents		Performance Coatings, Inc.	1-707-462-3023
Р	Penofin Weatherblaster	Lubricants / Fuels / Oils		Kano Laboratores	1-615-833-4101
	Penetrating Oil	Wood Products		JH Baxter	1-800-424-9300
	Pentachiorophenol Treated Wood	Adhesives / Sealants		Bowman Distribution	1-303-623-5716
	Permatex High Tack Adhesive Sealant	Adhesives / Sealants		ITW Devcon	1-800-424-9300 3 of 5
	Plastic Steel Putty (A) Resin	, and the contract of the cont			3 01 5



Product Name:	Category:	Also Known As / or Used For:	Manufacturer:	Emerg Phone
Plastic Steel 5-Minute Putty (SF) Resin	Adhesives / Sealants		ITW Devcon	1-800-424-9300
Pneumatic/Hydraulic Seal 545 Thread Sealant	Adhesives / Sealants		Loctite Corporation	1-860-571-5100
Polymeric Coated Steel Products	Steel Products		Several Facilities	1-800-255-3924
Polyurethane Expanding Foam Sealant	Adhesives / Sealants		Red Devil, Inc.	1-918-825-5744
Power Plus II Carb, Choke & Throttle Body Cleaner	Cleaners / Solvents		Bowman Distribution	1-800-424-9300
Premalube Xtreme Green	Lubricants / Fuels / Oils		Certified Labs, Div. of NCH Corp.	1-800-424-9300
Primer Pretreatment for Metals	Paints / Primers / Thinners		Rodda Paint Company	
	Lubricants / Fuels / Oils		American Energy Propane	503-285-9378
Propane	Adhesives / Sealants		Loctite Corporation	1-860-571-5100
PST Pipe Sealant			Several Facilities	1-800-255-3924
PVC Pipe Cement	Adhesives / Sealants		Several Facilities	1-800-255-3924
PVC Pipe Primer	Adhesives / Sealants		Several Facilities	1-800-255-3924
PVC Plastic Pipe	PVC /HDPE Products		Several Facilities	1-800-255-3924
PVC Truss & Solid Wall Pipe	PVC /HDPE Products			1-817-834-6321
Pyroshield 5180	Lubricants / Fuels / Oils		Lubrication Engineers, Inc.	1-017-004-0021
P. Danda Cil LID 46	Lubricants / Fuels / Oils	•	Texaco Refining & Marketing, Inc.	1-914-831-3400
R Rando Oil HD 46	Lubricants / Fuels / Oils		Relton Corporation	1-800-424-9300
Rapid Tap			Ross Island Sand & Gravel	503-239-5504
Ready Mix Concrete	Concrete Materials		CompAir Reavell Limited (England)	0-473-602222
Reavellite Compressor Lubricant	Lubricants / Fuels / Oils		Seymour of Sycamore, Inc.	1-800-255-3924
Red Iron Oxide Primer	Paints / Primers / Thinners		Seymour or Sycamore, Inc. Bowman Distribution	1-303-623-5716
Red Iron Oxide Primer High Solids Coating	Paints / Primers / Thinners			1-800-424-9300
Red Oxide Fast Dry Metal Primer	Paints / Primers / Thinners		Kelley Technical Coatings	1-847-367-7700
Red Striping Paint	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
Red-Orange Fluorescent Spray	Paints / Primers / Thinners		Rust-Oleum Corporation	
Resin Bonded Abrasive Products	Abrasives		Barnes Distribution	1-508-795-5000
Resinoid Bonded Abrasive Wheels	Abrasives		Flexovit USA, Inc.	1-716-549-5100
Resinoid Bonded Grinding Wheels	Abrasives		Norton Company	1-508-795-2690
Ridge Dark Thread Cutting Oil	Lubricants / Fuels / Oils		Ridge Tool Company	1-216-323-5581
Roadsaver 221	Adhesives / Sealants		Crafco, Inc.	1-800-528-8242
RTV Blue Silicone "Easy" Gasket Maker	Adhesives / Sealants		Bowman Distribution	1-303-623-5716
RTV Silicone - Low Volatile Blue	Adhesives / Sealants		American Jetway Corporation	1-800-424-9300
			Hilti, Inc.	1-800-424-9300
S Safety Boosters	Chemicals			1-847-367-7700
Safety Red Spray Paint	Paints / Primers / Thinners		Rust-Oleum Corporation	1-800-752-7869
Safety-Kleen Premium Solvent	Cleaners / Solvents		Safety-Kleen Corp.	
SC 2000 Cement	Adhesives / Sealants		REMA Tip-op International	1-800-424-9300
Scotch Grip (135) / High Performance Contact Adhesive Scotch Grip (1357, 1357 Neutral, 1357-L)	Adhesives / Sealants		3M Center	1-800-364-3577
High Performance Contact Adhesive	Adhesives / Sealants		3M Center	1-800-364-3577
	Adhesives / Sealants		3M Center	1-800-364-3577
Scotchkote Brand 206N Fusion Bonded Epoxy Coating	Wood Products		Mantek, Division of NCH Corp.	1-972-438-1381
Sea Sweep			Penhall Construction Products	1-714-776-0937
Segmented Diamond Blades and Core Bits	Abrasives	Daniel for Custin Handward	Performance Coatings, Inc.	1-800-424-9300
Semi-Transparent Stain	Paints / Primers / Thinners	Penofin for Exotic Hardwood		1-800-424-9300
Semi-Transparent Stain	Paints / Primers / Thinners	Penofin for Pressure Treated Wood	Performance Coatings, Inc.	1-800-424-9300
Semi-Transparent Stain	Paints / Primers / Thinners	Penofin Ultra Premium Oil	Performance Coatings, Inc.	
Semi-Transparent Stain	Paints / Primers / Thinners	Penofin Oil 550 VOC Formula	Performance Coatings, Inc.	1-800-424-9300
Sikadur 36 Marine Gel Part A	Adhesives / Sealants		Sika Corporation	1-800-424-9300
Sikadur 36 Marine Gel Part B	Adhesives / Sealants		Sika Corporation	1-800-424-9300
Sikadur 51 SL Flexible Epoxy Control Joint Resin	Adhesives / Sealants		Sika Corporation	1-800-424-9300
Silicone Lube	Lubricants / Fuels / Oils		Bowman Distribution	1-303-623-5716
Simple Green Cleaner / Degreaser	Cleaners / Solvents		Sunshine Makers, Inc.	1-800-255-3924
SOL/3	Paints / Primers / Thinners	Stain	The Sherwin-Williams Company	1-216-566-2917
Soy Repsonse (Aerosol)	Cleaners / Solvents		Zep Manufacturing	1-877-541-2016
Splash Zone Compound A & B	Adhesives / Sealants	Z*SPAR	Kop-Coat, Inc.	1-412-681-6669
	Adhesives / Sealants	Z*SPAR	Kop-Coat, Inc.	1-412-681-6669
Splash Zone Compound A-788	Adhesives / Sealants	2 OF AIN	Carboline Co.	1-800-424-9300
Splash Zone Mastic PT A	Adhesives / Sealants		Kop-Coat, Inc.	1-412-681-6669
Splash Zone Mastic PT A			Hilti, Inc.	1-800-424-9300
Spray Lubricant	Lubricants / Fuels / Oils		Eutectic Corporation	1-704-527-9800
Stainless Jobpak	Welding Products		Reliance Steel & Aluminum Co.	1-213-582-2272
Chairless Charle	Steel Products		Reliance Steel & Aluminum Co.	
Stainless Steels Steel, High Strength Low Alloy	Steel Products		Geneva Steel	1-801-227-9475



	Product Name:	Category:	Also Known As / or Used For:	Manufacturer:	Emerg Phone
S	Super Cold Galv (Bulk)	Paints / Primers / Thinners		Thermacote Welco	1-704-739-6421
	Super Cold Galv (Aerosol)	Paints / Primers / Thinners		Harris Welco	1-800-424-9300
	Synthetic Lubricating Oil	Lubricants / Fuels / Oils		Hilti, Inc.	1-800-424-9300
Т	Tekusolv II Red	Lubricants / Fuels / Oils		Certified Labs, div of NCH Corp	1-800-424-9300
	Termin-8 Wood Preservative, Green	Wood Products		Jasco Chemical	1-800-424-9300
	Texaco Antifreeze/Coolant	Lubricants / Fuels / Oils		Texaco Industries, Inc.	1-800-424-9300
	Texaco Rando HD 22-68	Lubricants / Fuels / Oils		Chevron Texaco Global Lubricants	1-800-424-9300
	Thinner #4	Paints / Primers / Thinners	-	Carboline Co.	1-800-424-9300
	Toluene	Cleaners / Solvents		Shell	1-713-473-9461
	Trisodium Phosphate Anhydrous	Chemicals		Kelley Technical Coatings	1-303-595-9048
U	Ultra Copper High Temp RTV Silicone	Abrasives		Permatex, Inc.	1-877-376-2839
٠	Underwater Hull Coating, Black	Paints / Primers / Thinners		Devoe Coatings Company	1-800-424-9300
	Ursa Super Plus SAE 15W-40	Lubricants / Fuets / Oils		Texaco Industries, Inc.	1-800-424-9300
	Ursa Super Plus SAE 30	Lubricants / Fuels / Oils		Texaco Industries, Inc.	1-800-424-9300
	UT-R20 Hardener	Adhesives / Sealants		REMA Tip-op International	1-800-424-9300
v	Valve Action Paintmaker	Paints / Primers / Thinners		LA-CO Industries, Inc. / Markal Co.	1-800-424-9300
•	·Vari-Purpose Gear Lubricant, SAE 140	Lubricants / Fuels / Oils		Texas Refinery Corp.	1-800-424-9300
W	W.B. Convoy II, Light Gray	Paints / Primers / Thinners		Kelley Technical Coatings	1-502-636-2561
	Wax & Grease Remover	Cleaners / Solvents		Imperial Paint Company, Inc.	1-800-424-9300
	Welco 15-15FC	Welding Products		Harris Welco	1-800-424-9300
	White Spray Paint	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
	White Striping	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
	Wil-Bond 200	Adhesives / Sealants		UltraBond Manufacturing Co.	
	Wil-X Cement	Adhesives / Sealants		Williams Form Engineering	
	Wolmanized Wood & Lumber	Wood Products		Wheeler Consolidated, Inc.	1-800-424-9300
	Wood Dust	Wood Products		Wheeler Consolidated, Inc.	1-800-424-9300
	Wynn's Ultra-Synthet 951	Lubricants / Fuels / Oils		Wynn Oil Company	1-800-424-9300
X	Xylene	Paints / Primers / Thinners		Miller Paint Co.	1-800-424-9300
Υ	Yellow Striping	Paints / Primers / Thinners		Rust-Oleum Corporation	1-847-367-7700
	Yellow Tail Wet Welding Electrodes	Welding Products		Magnum Mfg., Inc.	1-760-868-6748
Z	Zep Formula 50	Cleaners / Solvents		ZEP Manufacturing Company	1-877-428-9937
	Zep Reach	Cleaners / Solvents		ZEP Manufacturing Company	1-877-428-9937
	Zep-A-Lume	Cleaners / Solvents	Aluminum Cleaner	ZEP Manufacturing Company	1-877-428-9937
	Zinc	Welding Products		Pasminco Incorporated	1-800-424-9300
	Zinc Clad 108 Vinyl Coating (Part A)	Adhesives / Sealants		The Sherwin Williams Company	1-216-566-2917
	Zinc Clad 108 Vinyl Coating (Part B)	Adhesives / Sealants		The Sherwin Williams Company	1-216-566-2917
	Zinc Clad 108 Vinyl Coating (Part C)	Adhesives / Sealants		The Sherwin Williams Company	1-216-566-2917
	Zinc-Coated Steel Products	Steel Products		Several Facilities	1-800-255-3924
	Zinc Standard Grey 2.8	Cleaners / Solvents		Wasser Corporation	1-800-627-2968
	Zircotex Flap Discs	Abrasives		Flexovit USA, Inc.	1-716-549-5100



Manufacturer:	Product Name:	Category:	Also Known As / or Used For:	Emerg Phone
3M Center	Scotch Grip (135) / High Performance Contact Adhesive Scotch Grip (1357, 1357 Neutral, 1357-L)	Adhesives / Sealants		1-800-364-3577
3M Center	High Performance Contact Adhesive	Adhesives / Sealants		1-800-364-3577
3M Center	Scotchkote Brand 206N Fusion Bonded Epoxy Coating	Adhesives / Sealants		1-800-364-3577
A Alconox, Inc.	Alconox	Cleaners / Solvents		1-800-255-3924
American Energy Propane	Propane	Lubricants / Fuels / Oils		503-285-9378
American Jetway Corporation	RTV Silicone - Low Volatile Blue	Adhesives / Sealants		1-800-424-9300
Angus Chemical Company	Nitromethane	Lubricants / Fuels / Oils		1-800-424-9300
ARCO Products Company	Diesel No.2	Lubricants / Fuels / Oils	•	1-800-424-9300
ARCO Products Company	Low Sulfur Diesel No.2	Lubricants / Fuels / Oils		1-800-424-9300
ARCO Products Company	Off-Road DieselNo.2	Lubricants / Fuels / Oils		1-800-424-9300
Avesta Polarit, Inc.	Cr-Ni and Ni Alloy Coated Electrodes	Welding Products		1-800-424-9300
Barnes Distribution	Aluminum Oxide Shop Rolls Coated Abrasives	Abrasives		1-800-424-9300
Barnes Distribution	Briterite Surface Conditioning Discs	Abrasives		1-800-424-9300
Barnes Distribution	Emery Cloth	Abrasives		1-800-424-9300
Barnes Distribution	Flap Wheels	Abrasives		1-800-424-9300
Barnes Distribution	Resin Bonded Abrasive Products	Abrasives		1-508-795-5000
Benz Oil, Inc.	Enerpac HE	Lubricants / Fuels / Oils		1-414-442-2900
Blue Star Industries	Offshore Oil	Lubricants / Fuels / Oils		1-800-424-9300
Bostik, Inc.	Never-Seez Regular Grade	Lubricants / Fuels / Oils		1-800-227-0332
Bowman Distribution	Abrasive Cloth Roll (Aluminum Oxide Type)	Abrasives		1-800-332-3073
Bowman Distribution	Anti-Seize High Temperature Thread Compound	Lubricants / Fuels / Oils		1-800-424-9300
Bowman Distribution	Anti-Static CRT Cleaner	Cleaners / Solvents		1-303-623-5716
Bowman Distribution	Ford Blue High Solids Coating	Paints / Primers / Thinners		1-800-424-9300
Bowman Distribution	Gloss Black	Paints / Primers / Thinners		1-800-424-9300
Bowman Distribution	Gloss White High Solids Coating	Paints / Primers / Thinners		1-800-424-9300
Bowman Distribution	Heavy Wall Heat Shrink Tubing	Electrical		1-800-424-9300
Bowman Distribution	I H Red Solids Coating	Paints / Primers / Thinners		1-800-424-9300
Bowman Distribution	Industrial Water Based Enamel	Paints / Primers / Thinners		1-800-424-9300
Bowman Distribution	Loctite High Strength Thread Locker	Adhesives / Sealants		1-800-425-9300
Bowman Distribution	Loctite Hi-Tack Adhesive Sealant	Adhesives / Sealants		1-800-424-9300
Bowman Distribution	Loctite Hydraulic Sealant	Adhesives / Sealants		1-800-425-9300
Bowman Distribution	Loctite Medium Strength Thread Locker	Adhesives / Sealants		1-800-425-9300
Bowman Distribution	Loctite Pipe Sealant With Teflon	Adhesives / Sealants		1-800-425-9300
Bowman Distribution	Loctite Super Glue	Adhesives / Sealants		1-800-424-9300
Bowman Distribution	Lubriplate 105	Lubricants / Fuels / Oils		1-303-623-5716
Bowman Distribution	Non-ODC Brake Cleaner	Cleaners / Solvents		1-216-416-7200
Bowman Distribution	Non-ODC Brake Cleaner - Aerosol	Cleaners / Solvents		1-216-416-7200
Bowman Distribution	Ozzy Juice Degreasing Solution	Cleaners / Solvents		1-216-416-7200
Bowman Distribution	Permatex High Tack Adhesive Sealant	Adhesives / Sealants		1-303-623-5716
Bowman Distribution	Power Plus II Carb, Choke & Throttle Body Cleaner	Cleaners / Solvents		1-800-424-9300



Manufacturer:	Product Name:	Category:	Also Known As / or Used For:	Emerg Phone
Bowman Distribution	Red Iron Oxide Primer High Solids Coating	Paints / Primers / Thinners		1-303-623-5716
Bowman Distribution	RTV Blue Silicone "Easy" Gasket Maker	Adhesives / Sealants		1-303-623-5716
Bowman Distribution	Silicone Lube	Lubricants / Fuels / Oils		1-303-623-5716
Burke Chemicals	Epoxy Mortar, Part B	Adhesives / Sealants		1-800-424-9300
Carboline Co.	Splash Zone Mastic PT A	Adhesives / Sealants		1-800-424-9300
Carboline Co.	Thinner #4	Paints / Primers / Thinners		1-800-424-9300
Celtite Technik, USA	Hi-Bond TX Part A	Adhesives / Sealants		1-502-863-6800
Celtite Technik, USA	Hi-Bond TX Part B	Adhesives / Sealants		1-502-863-6800
Certified Labs, Div. of NCH Corp.	Aqua-Sol 20/20	Cleaners / Solvents		1-800-424-9300
Certified Labs, Div. of NCH Corp.	CCX-97	Lubricants / Fuels / Oils		1-800-424-9300
Certified Labs, Div. of NCH Corp.	CCX-97 Aerosol	Lubricants / Fuels / Oils		1-800-424-9300
Certified Labs, Div. of NCH Corp.	Nautica #120	Lubricants / Fuels / Oils		1-800-424-9300
Certified Labs, Div. of NCH Corp.	Premalube Xtreme Green	Lubricants / Fuels / Oils		1-800-424-9300
Certified Labs, Div. of NCH Corp.	Tekusolv II Red	Lubricants / Fuels / Oils		1-800-424-9300
Chevron	Chevron AW Hydraulic Oil 46	Lubricants / Fuels / Oils		1-800-457-2022
Chevron	Chevron Regular Gasoline	Lubricants / Fuels / Oils		1-800-457-2022
Chevron	Chevron Way Oil Vistac / ISO 220	Lubricants / Fuels / Oils		1-800-457-2022
Chevron	Diesel Fuel No.2	Lubricants / Fuels / Oils		1-800-457-2022
Chevron	Diesel Fuel No.2 (HS)	Lubricants / Fuels / Oils	•	1-800-457-2022
Chevron TexacoGlobal Lubricants	Texaco Rando HD 22 - 68	Lubricants / Fuels / Oils		1-800-231-0623
CompAir Reavell Limited (England)	Reavellite Compressor Lubricant	Lubricants / Fuels / Oils		0-473-602222
Courtaulds Coatings	Gray Primer 351 (Part A)	Paints / Primers / Thinners		1-800-854-6813
Courtaulds Coatings	Interline 785	Adhesives / Sealants	7800 Magna Line	1-800-854-6813
Crafco, Inc.	Roadsaver 221	Adhesives / Sealants	ů	1-800-528-8242
CRC Chemicals	3-36 Aerosol	Lubricants / Fuels / Oils		1-215-674-4300
CRC Chemicals	CRC Penetrating Oil (Aerosol) #3060	Lubricants / Fuels / Oils		1-215-674-4300
CRC Industries, Inc.	Heavy Duty Degreaser Aerosol	Cleaners / Solvents		1-215-674-4300
Dayton Superior Chemical Division	Advantage Grout (1107)	Adhesives / Sealants		1-937-866-1286
Delco Remy Division	Delco Batteries	Electrical		1-317-646-3080
Devoe Coatings Company	Bar-OX 450 Alkyd Gloss Enamel Signal Yellow	Paints / Primers / Thinners		1-800-424-9300
Devoe Coatings Company	Devran 230 High Build Epoxy Coating, Black Base	Adhesives / Sealants		1-800-424-9300
Devoe Coatings Company	Underwater Hull Coating, Black	Paints / Primers / Thinners		1-800-424-9300
Diamond Products	Diamond Drill Bits & Blades	Abrasives		1-440-323-4616
Dow Corning Corporation	Multi-Purpose (732) Sealant-Clear(Dow Corning)	Adhesives / Sealants		1-517-496-5900
Equilon Enterprises, LLC.	ATF Mercon/Dexron II	Lubricants / Fuels / Oils		1-877-276-7283
Eutectic Corporation	Stainless Jobpak	Welding Products		1-704-527-9800
Evamarine, Marine Thinner	Evamarine, Marine Thinner	Paints / Primers / Thinners		1-800-424-9300



	Manufacturer:	Product Name:	Category:	Also Known As / or Used For:	Emerg Phone
F	Farwest paint Manufacturing Co.	Asphalt Varnish (#40 Vitanic Black)	Adhesives / Sealants		1-800-424-9300
1	Fiske Brothers Refining Co.	Lubriplate "APG" Series	Lubricants / Fuels / Oils		1-201-589-9150
ı	Fiske Brothers Refining Co.	Lubriplate 105	Lubricants / Fuels / Oils		1-201-589-9150
ı	Flexovit USA, Inc.	Resinoid Bonded Abrasive Wheels	Abrasives		1-716-549-5100
1	Flexovit USA, Inc.	Zircotex Flap Discs	Abrasives		1-716-549-5100
ı	Forrest Paint Co.	19S Epoxy Base Series Master	Adhesives / Sealants		1-800-424-9300
ļ	Forrest Paint Co.	19S Epoxy Semi-Gloss Catalyst B	Adhesives / Sealants		1-800-424-9300
F	Forrest Paint Co.	31E Acrylic / Alkyd Enamel Aerosol Series	Paints / Primers / Thinners		1-800-424-9300
					1-000-424-8300
G	GB Electrical, Inc.	Duct Seal	Lubricants / Fuels / Oils		1-800-624-4320
(Geneva Steel	Steel, High Strength Low Alloy	Steel Products		1-801-227-9475
(GOJO Industries, Inc.	GOJOr Natural Orange Pumice Hand Cleaner	Cleaners / Solvents		1-800-424-9300
					1-800-424-9300
Η м	Milwaukie Electric Tool Company	Hawg Wash	Cleaners / Solvents		1-80-424-9300
ŀ	Harris Welco	#5 Solder	Welding Products		1-800-424-9300
۲	Harris Welco	Gal Viz	Welding Products		1-800-424-9300
H	Harris Welco	Super Cold Galv (Aerosol)	Paints / Primers / Thinners		1-800-424-9300
H	Harris Welco	Welco 15-15FC	Welding Products		1-800-424-9300
۲	Hilti, Inc.	CC 410 EP Epoxy Skidproofer	Adhesives		1-800-424-9300
F	Hitti, Inc.	Chuck Grease	Lubricants / Fuels / Oils		1-800-424-9300
H	Hilti, Inc.	CS 2130 Polyurethane Sealant	Paints / Primers / Thinners		1-800-424-9300
H	Hilti, Inc.	HIT C-100 Dowelling	Adhesives / Sealants		1-800-879-4444
H	Hilti, Inc.	HIT HY 150	Adhesives / Sealants		1-800-424-9300
H	Hilti, Inc.	HIT-RE 500	Adhesives / Sealants	High Strength Adhesive for Concrete	1-800-424-9300
Н	Hilti, Inc.	HVU	Adhesives / Sealants	Adhesive Anchor System	1-800-424-9300
н	filti, Inc.	MC 850 Sprayable Gel Graffiti Remover	Paints / Primers / Thinners	· ·	
Н	Hilti, Inc.	MC300 Biodegreaser	Cleaners / Solvents		1-800-424-9300
Н	filti, Inc.	MEA	Adhesives / Sealants	Resin	1-800-424-9300
Н	filti, Inc.	Safety Boosters	Chemicals	resir	1-800-424-9300
Н	filtí, Inc.	Spray Lubricant	Lubricants / Fuels / Oils		1-800-424-9300
Н	lilti, Inc.	Synthetic Lubricating Oil	Lubricants / Fuels / Oils		1-800-424-9300
Н	luron Industries	Isopropanol	Lubricants / Fuels / Oils		1-800-424-9300
Н	lydrosol, Inc.	Blast-Off Carb & Choke Cleaner BD1032	Cleaners / Solvents	•	1-800-535-5053 1-708-598-7100
н	łydrosol, Inc.	Brake Parts Cleaner BD1025	Cleaners / Solvents		1-708-598-7100
					1-700-080-7 100
1 In	nperial Paint Company, Inc.	Wax & Grease Remover	Cleaners / Solvents		1-800-424-9300
IT	TW Devcon	Liquid Hardener 0202	Adhesives / Sealants	·	1-800-424-9300
IT	TW Devcon	Plastic Steel Putty (A) Resin	Adhesives / Sealants		1-800-424-9300
IT	TW Devcon	Plastic Steel 5-Minute Putty (SF) Resin	Adhesives / Sealants		1-800-424-9300
		•••			1-000-424-9300



Manufacturer:	Product Name:	Category:	Also Known As / or Used For:	Emerg Phone
Jadco Chemical, Ltd.	Landa Dyna Might	Cleaners / Solvents		1-800-424-9300
James River Corporation/Camas Mill	Chlorine Dioxide	Chemicals		1-206-834-3021
Jasco Chemical	Termin-8 Wood Preservative, Green	Wood Products		1-800-424-9300
	Ammoniacal Copper Zinc Arsenate (ACZA)	Wood Floducia		1-800-424-9300
JH Baxter	Treated Wood	Wood Products		1-800-424-9300
JH Baxter	Creosote Petroleum 50/50 Treated Wood	Wood Products		1-800-424-9300
JH Baxter	Creosote Treated Wood	Wood Products		1-800-424-9300
JH Baxter	Pentachlorophenol Treated Wood	Wood Products		1-800-424-9300
Kelley Technical Coatings	Red Oxide Fast Dry Metal Primer	Paints / Primers / Thinners		1-800-424-9300
Kelley Technical Coatings	Trisodium Phosphate Anhydrous	Chemicals		1-303-595-9048
Kelley Technical Coatings	W.B. Convoy II, Light Gray	Paints / Primers / Thinners		1-502-636-2561
Kleen Blast Abrasives	Kleen Blast	Abrasives		1-925-831-9800
Kop-Coat, Inc.	Splash Zone Compound A & B	Adhesives / Sealants	Z*SPAR	1-412-681-6669
Kop-Coat, Inc.	Splash Zone Compound A-788	Adhesives / Sealants	Z*SPAR	1-412-681-6669
Kop-Coat, Inc.	Splash Zone Mastic PT A	Adhesives / Sealants		1-412-681-6669
Kroil Laboratories	Penatrating Oil	Lubricants / Fuels / Oils		1-615-833-4101
LA-CO Industries, Inc. / Markal Co.	Valve Action Paintmaker	Paints / Primers / Thinners		1-800-424-9300
Lawson Products, Inc.	Glass Cleaner	Cleaners / Solvents		1-303-623-5716
Linde Union Carbide	Acetylene	Welding Products		1-800-822-4357
Linde Union Carbide	Air	Welding Products		1-800-822-4357
Loctite Corporation	NSF 680 Retaining Compound High Strength	Adhesives / Sealants		1-860-571-5100
Loctite Corporation	Pneumatic/Hydraulic Seal 545 Thread Sealant	Adhesives / Sealants		1-860-571-5100
Loctite Corporation	PST Pipe Sealant	Adhesives / Sealants		1-860-571-5100
Lubrication Engineers, Inc.	Pyroshield 5180	Lubricants / Fuels / Oils		1-817-834-6321
Magnum Mfg., Inc.	Yellow Tail Wet Welding Electrodes	Welding Products		1-760-868-6748
Makita USA, Inc.	Abrasive Grinding Wheel	Abrasives	Cut-Off Wheel, Flex Wheel, Sanding Disc	1-800-424-9300
Mantek, Division of NCH Corp.	Sea Sweep	Wood Products	•	1-972-438-1381
Markal Company	Markal Paintstik "B" & "B-3"	Paints / Primers / Thinners		1-312-826-1700
Metro-Chem	001-M Waterless Handcleaner with Z-CON	Cleaners / Solvents	•	1-360-944-6100
Metro-Chem	191 Power Plus	Cleaners / Solvents		1-360-944-6100
Miller Paint Co.	Xylene	Paints / Primers / Thinners		1-800-424-9300
Moraine Liquid Technologies	A W Hydraulic Oil ISO - 32	Lubricants / Fuels / Oils		1-800-851-7523
NCH Corp.	Drainsert	Adhesives / Sealants		1-972-438-1381
Norton Company	Nonabrasive Cleaning Pads	Abrasives		1-508-795-2690
Norton Company	Resinoid Bonded Grinding Wheels	Abrasives		1-508-795-2690



Manufacturer:	Product Name:	Category:	Also Known As / or Used For:	Emerg Phone
P Pasminco Incorporated	Zinc	Welding Products		1-800-424-9300
Penhall Construction Products	Segmented Diamond Blades and Core Bits	Abrasives		1-714-776-0937
Penhall Diamond Products	Metal Bonds for Diamond Blades & Bits	Abrasives	•	1-714-776-0937
Performance Coatings, Inc.	Penofin Weatherblaster	Cleaners / Solvents		1-707-462-3023
Performance Coatings, Inc.	Semi-Transparent Stain	Paints / Primers / Thinners	Penofin for Exotic Hardwood	1-800-424-9300
Performance Coatings, Inc.	Semi-Transparent Stain	Paints / Primers / Thinners	Penofin for Pressure Treated Wood	1-800-424-9300
Performance Coatings, Inc.	Semi-Transparent Stain	Paints / Primers / Thinners	Penofin Ultra Premium Oil	1-800-424-9300
Performance Coatings, Inc.	Semi-Transparent Stain	Paints / Primers / Thinners	Penofin Oil 550 VOC Formula	1-800-424-9300
Permatex Industrial Corporation	Fast Orange Pumice Hand Cleaner	Cleaners / Solvents		1-203-571-5100
Permatex, Inc.	Ultra Copper High Temp RTV Silicone	Abrasives		1-877-376-2839
Porter Paint Co.	MCR-43 Gloss Epoxy	Adhesives / Sealants		1-502-588-9200
Praxair	Argon	Welding Products		1-800-424-9300
R Red Devil. Inc.	_			
	Polyurethane Expanding Foam Sealant	Adhesives / Sealants		1-918-825-5744
Reliance Steel & Aluminum Co.	Aluminum Alloy	Aluminum Products	Aluminum Products	
Reliance Steel & Aluminum Co.	Carbon & Alloy Steels	Aluminum Products		1-213-582-2272
Reliance Steel & Aluminum Co.	Stainless Steels	Steel Products		1-213-582-2272
Relton Corporation	Rapid Tap	Lubricants / Fuels / Oils		1-800-424-9300
REMA Tip-op International	SC 2000 Cement	Adhesives / Sealants		1-800-424-9300
REMA Tip-op International	UT-R20 Hardener	Adhesives / Sealants		1-800-424-9300
Ridge Tool Company	Ridge Dark Thread Cutting Oil	Lubricants / Fuels / Oils		1-216-323-5581
Rodda Paint Company	Primer Pretreatment for Metals	Paints / Primers / Thinners		
Ross Island Sand & Gravel	Ready Mix Concrete	Concrete Materials		503-239-5504
Rust-Oleum Corporation	Alert Orange Spray Paint	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Blue Striping	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Caution Blue Spray	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Caution Yellow Spray	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Fluorescent Green	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Fluorescent Green Spray	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Fluorescent Orange	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Fluorescent Red	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Fluorescent Yellow	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	High Visibility Yellow	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Medium Blue Striping #9805118	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Red Striping Paint	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Red-Orange Fluorescent Spray	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Safety Red Spray Paint	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	White Spray Paint	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	White Striping	Paints / Primers / Thinners		1-847-367-7700
Rust-Oleum Corporation	Yellow Striping	Paints / Primers / Thinners		1-847-367-7700



Manufacturer:	Product Name:	Category:	Also Known As / or Used For:	Emerg Phone
Safety-Kleen Corp.	Safety-Kleen Premium Solvent	Cleaners / Solvents		1-800-752-7869
Several Facilities	ABS Pipe Cement	Adhesives / Sealants		1-800-366-3924
Several Facilities	Aluminum Coated Steel Products	Aluminum Products	·	1-800-255-3924
Several Facilities	Aramid Fiber Bonded Corrugated Steel Pipe	Steel Products		1-800-255-3924
Several Facilities	Asphalt Coated Steel Products	Steel Products		1-800-255-3924
Several Facilities	Corrugated Aluminum Pipe & Accessories	Aluminum Products		1-800-255-3924
Several Facilities	Polymeric Coated Steel Products	Steel Products		1-800-255-3924
Several Facilities	PVC Pipe Cement	Adhesives / Sealants		1-800-255-3924
	,	Adhesives / Sealants		1-800-255-3924
Several Facilities Several Facilities	PVC Pipe Primer PVC Plastic Pipe	PVC /HDPE Products		1-800-255-3924
	•	PVC /HDPE Products		1-800-255-3924
Several Facilities	PVC Truss & Solid Wall Pipe	Steel Products		1-800-255-3924
Several Facilities	Zinc-Coated Steel Products			1-800-255-3924
Seymour of Sycamore, Inc.	Ford Blue	Paints / Primers / Thinners		1-800-255-3924
Seymour of Sycamore, Inc.	Red Iron Oxide Primer	Paints / Primers / Thinners		
Shell	Toluene	Cleaners / Solvents		1-713-473-9461
Sika Corporation	Sikadur 36 Marine Gel Part A	Adhesives / Sealants		1-800-424-9300 1-800-424-9300
Sika Corporation	Sikadur 36 Marine Gel Part B	Adhesives / Sealants		1-800-424-9300
Sika Corporation	Sikadur 51 SL Flexible Epoxy Control Joint Resin	Adhesives / Sealants	Cement Grout	1-513-878-8651
Southwestern Portland Cement Co.	Miami & Type K		Dement Grout	1-800-424-9300
Spectrum Laboratory Products, Inc.	Acetic Acid	Chemicals		
Sunshine Makers, Inc.	Simple Green Cleaner / Degreaser	Cleaners / Solvents		1-800-255-3924
_	Ammoniacal Copper Zinc Arsenate (ACZA)			
Taylor Lumber & Treating, Inc.	Treated Wood	Wood Products		1-800-424-9300
Texaco Industries, Inc.	Multigear Lube EP SAE 80W-90	Lubricants / Fuels / Oils		1-800-424-9300
Texaco Industries, Inc.	Texaco Antifreeze/Coolant	Lubricants / Fuels / Oils		1-800-424-9300
Texaco Industries, Inc.	Ursa Super Plus SAE 15W-40	Lubricants / Fuels / Oils		1-800-424-9300
Texaco Industries, Inc.	Ursa Super Plus SAE 30	Lubricants / Fuels / Oils		1-800-424-9300
Texaco Refining & Marketing, Inc.	Diesel No.2 - Texaco	Lubricants / Fuels / Oils		1-914-831-3400
Texaco Refining & Marketing, Inc.	Rando Oil HD 46	Lubricants / Fuels / Oils		1-914-831-3400
Texas Refinery Corp.	Moly 880 Crown & Chassis	Cleaners / Solvents		1-800-424-9300
Texas Refinery Corp.	Vari-Purpose Gear Lubricant, SAE 140	Lubricants / Fuels / Oils		1-800-424-9300
The Burke Company	Burke Plug	Adhesives / Sealants		1-213-834-3401
The ESAB Group, Inc.	All-State Air Carbon Arc Gouging Electrodes	Welding Products		1-717-637-8911
The Euclid Chemical Company	Hi-Flow Grout	Adhesives / Sealants		1-800-321-7628
The Lincoln Electric Company	Excalibur 7018	Welding Products		1-216-481-8100
The Lincoln Electric Company	Fleetweld 180	Welding Products		1-216-481-8100
The Lincoln Electric Company	Fleetweld 35	Welding Products		1-216-481-8100
The Lincoln Electric Company	Fleetweld 5P+	Welding Products		1-216-481-8100
The Lincoln Electric Company	Innershield NR-211-MP	Welding Products		1-216-481-8100



	Manufacturer:	Product Name:	Category:	Also Known As / or Used For:	Emerg Phone
T	The Lincoln Electric Company	Jet-LH 78 MR	Welding Products		1-216-481-8100
•	The Lincoln Electric Company	Jetweld 3	Welding Products		1-216-481-8100
	The Lincoln Electric Company	Jetweld LH-110M MR	Welding Products		1-216-481-8100
	The Lincoln Electric Company	Murex 7018 MR (Speedex HTS-M MR)	Welding Products		1-216-481-8100
	The Sherwin Williams Company	Zinc Clad 108 Vinyl Coating (Part A)	Adhesives / Sealants		1-216-566-2917
	The Sherwin Williams Company	Zinc Clad 108 Vinyl Coating (Part B)	Adhesives / Sealants		1-216-566-2917
	The Sherwin Williams Company	Zinc Clad 108 Vinyl Coating (Part C)	Adhesives / Sealants		1-216-566-2917
	The Sherwin-Williams Company	Hi Bild Vinyl Finish, V766E Gray	Paints / Primers / Thinners		1-216-566-2917
	The Sherwin-Williams Company	Hi Bild Vinyl Finish, V766E White	Paints / Primers / Thinners		1-216-566-2917
	The Sherwin-Williams Company	SOL/3	Paints / Primers / Thinners	Stain	1-216-566-2917
	Thermacote Welco	#5 Solder	Welding Products		1-704-739-6421
	Thermacote Welco	Super Cold Galv (Bulk)	Paints / Primers / Thinners		1-704-739-6421
	Thin Film Technology, Inc.	Bio-Dur 561 Curing Agent	Adhesives / Sealants		1-713-333-9415
	ThoRoc/Harris Specialty Chemicals, Inc.	LV300 Injection Resin Part A	Adhesives / Sealants		1-904-996-6000
	Tyrolit Olympus Co., LTD.	Core Grind	Abrasives		1-662-324-0468
	Tyront Orympus Oo., ETD.				
u	UltraBond Manufacturing Co.	Wil-Bond 200	Adhesives / Sealants	Super Premium Synthetic Food Grade Breathing Air Compressor Fluid	
Ŭ	diabona manasasang car				1-561-588-7698
	Undersea Breathing Systems, Inc.	EZ-1000	Lubricants / Fuels / Oils	Breating Air Compressor Fuld	1-304-744-3487
	Union Carbide	Oxygen	Welding Products		1-800-822-4357
	Union Carbide Chemicals & Plastics Co., Inc.	Diethylenetriamine	Lubricants / Fuels / Oils		1-213-437-2813
	Unitor Ships Service, Inc.	Coldwash	Cleaners / Solvents		1-210-401-2010
v	Wasser Corporation	Zinc Standard Grey 2.8	Cleaners / Solvents		1-800-424-9300
•	Washington Trading Company, Inc	Ballistol	Cleaners / Solvents		1-252-261-6181
	Western Tube & Conduit Corporation	Mechanical Tubing	Steel Products		1-213-537-6300
	Wheeler Consolidated, Inc.	Wolmanized Wood & Lumber	Wood Products		1-800-424-9300
	Wheeler Consolidated, Inc.	Wood Dust	Wood Products		1-800-424-9300
	Williams Form Engineering	Wil-X Cement	Adhesives / Sealants		•
	Wynn Oil Company	Wynn's Ultra-Synthet 951	Lubricants / Fuels / Oils		1-800-424-9300
	Wyfiif Oil Company	Wymio cina cymio co			
Z	ZEP Manufacturing Company	Big Orange	Cleaners / Solvents		1-877-541-2016
	ZEP Manufacturing Company	Soy Response	Cleaners / Solvents		1-877-541-2016
	ZEP Manufacturing Company	Zep Formula 50	Cleaners / Solvents		1-877-428-9937
	ZEP Manufacturing Company	Zep Reach	Cleaners / Solvents		1-877-428-9937
	ZEP Manufacturing Company	Zep-A-Lume	Cleaners / Solvents	Aluminum Cleaner	1-877-428-9937